Reforming Retirement Income

Annuitization, Combination Strategies, and Required Minimum Distributions

Mark J. Warshawsky

December 2015

MERCATUS WORKING PAPER

MERCATUS CENTER
George Mason University
3434 Washington Blvd., 4th Floor, Arlington, Virginia 22201
www.mercatus.org

Mark J. Warshawsky. "Reforming Retirement Income: Annuitization, Combination Strategies, and Required Minimum Distributions." Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, December 2015.

Abstract

Laddered immediate life annuity purchase and asset withdrawal combination strategies represent an excellent way for retirees to manage their retirement assets in order to get lifetime income in a flexible manner while still maintaining growth, liquidity, and bequest potentials. Simulations show that even by age 95, a retiree using this strategy will get higher income, in inflation-adjusted terms, on average and across most scenarios than by using full and complete annuitization or just using the common 4 percent withdrawal rule. Moreover, a significant fund balance remains to the retiree throughout life, on average, but with no risk of running out of assets. The minimum distribution requirements that govern tax-qualified retirement accounts for older retirees should be reformed to encourage the use of these partial annuitization combination strategies. This broad reform of the required minimum distribution rules needs to be done for the same reason the Obama administration made a narrow exception to the required minimum distribution rules for longevity insurance—to achieve the reasonable public policy goal of encouraging the use of partial annuitization by retirees.

JEL codes: G23, G28, J32

Keywords: pensions, defined contribution plans, IRAs, life annuities, government regulation, required distributions, retirement income, investment strategies

Author Affiliation and Contact Information

Mark J. Warshawsky, PhD
Senior Research Fellow
Mercatus Center at George Mason University
mwarshawsky@mercatus.gmu.edu

Reforming Retirement Income

Annuitization, Combination Strategies, and Required Minimum Distributions

Mark J. Warshawsky

I. Introduction

There has recently been great policy interest in promoting the use of life annuities ("annuitization") for retirement account assets by plan participants and individual retirement account (IRA) holders. With the decline in automatic annuitization from defined benefit pension plans, policymakers are concerned about the financial security of retirees—that retirees receive continual income payments over increasingly longer lifetimes. The Obama administration recognizes, however, that voluntary full and total annuitization may be an unrealistic and perhaps even inappropriate policy goal for most retired households, given the current relatively limited use of life annuities from assets held in defined contribution retirement plans. Therefore, the Obama administration has indicated that it wants to support partial annuitization.

The main indication of the administration's tangible encouragement of partial annuitization is the exemption of longevity insurance from the minimum distribution requirements (MDRs) governing all individual accounts for retirees over age 70.5. Longevity insurance involves the use of a specific annuity product—a deeply deferred life annuity that begins payments as late as age 85, presumably combined with some strategy of distributions from a retirement investment account until then. It is strange that the administration has chosen to favor this particular product over the many other possible partial combination annuity and withdrawal strategies, given that the literature finds longevity insurance inferior to other strategies, in terms of market pricing, income production, retirement security, and risk.

This paper builds on my own and some related research, with two goals: to show the advantage of a broad genus of partial annuitization combination strategies and to propose a reform of the MDRs, which would encourage the use of these strategies. In particular, I explain the flexibility and security of combination strategies, which use systematic withdrawals from a dynamically changing investment portfolio together with the laddered purchase of immediate life annuities over an extended period of time. I demonstrate the superior risk and return properties of this type of strategy, compared to full and complete annuitization and asset-only withdrawals, using historical simulations.

I then propose a broad reform of the MDRs that would better accommodate these combination strategies, which are likely to be more popular with retirees than longevity insurance. In particular, I recommend that the actuarial value of payout annuities purchased under a combination strategy be calculated and included in the total value of the account subject to the MDRs, as opposed to having two separate regulatory regimes for immediate life annuities and asset withdrawals, as done under current IRS regulations. In this way, higher income from a partial annuitization combination strategy would enjoy the advantage of the easier rules that now apply only to distributions from assets and longevity insurance. I also illustrate the operation of this proposed regime of reformed MDRs by using historical simulations.

II. Literature Review

A. Life Annuities vs. Systematic Withdrawals

Warshawsky (2015) conducts a comprehensive comparison of two simple retirement income strategies: the Bengen (1994) withdrawal rule and the immediate life annuity. In particular, by using historical simulations, the differences are calculated between the inflation-adjusted annual income produced by the Bengen rule (4 percent annual withdrawal, subsequently adjusted for the rate of inflation) and the inflation-adjusted income produced by a joint-and-50-percent-to-survivor life annuity for a couple of the same age, at various retirement ages, averaged over the lifetimes of various cohorts and then averaged over the cohorts. With younger retirement ages, the number of cohorts available for analysis using historical data is, of course, smaller than with older retirement ages. Warshawsky calculates the cohort lifetime average in two ways: as a simple average over the entire possible horizon (to age 110) and as an average weighted by survival probabilities. Also, the study counts the number of cohorts in which the Bengen rule produces higher average income than does the life annuity at various retirement ages.

For retirement age 55, Warshawsky's results indicate that the Bengen withdrawal rule is clearly superior to the life annuity. The Bengen rule produces higher income in more cohorts, and the average value of income differences, measured by the mean across cohorts, is significantly positive at $720. The weighted average measures are not as impressive, though. With an early retirement age and therefore a long retirement period, the force of inflation wears down the life annuity, and the possibility of favorable asset returns over the long run favors the Bengen rule. But as the retirement age moves toward one of the more common ages (62–70), the several measures there clearly show that the life annuity is the favorite, whether looking at simple averages or weighted averages of counts of income differences. For example, at age 67, the Bengen rule produces higher average income in only about two-fifths of the cohorts, and the average income difference is negative (−$794). With survival weighting, the results are worse under the Bengen rule.

It should not be concluded, however, that the immediate life annuity is always or even necessarily the superior distribution method for the entire portfolio of asset holdings in individual accounts for retirees, compared with the Bengen withdrawal rule. Some retirees will have impaired longevity prospects, and for them the immediate life annuity may be a relatively poor investment. Other retirees, perhaps facing idiosyncratic risks or with inadequate insurance coverage (for health, long-term care, their homes, or something else) may really need liquidity, which a life annuity is not able to provide. Some retirees may prefer higher income flows focused on the latter part of retirement, which most nominal annuities are not able to provide. Some retirees may have comprehensive traditional pension coverage or may be quite well off relative to their desired spending needs, so their need for life annuity protection is low. Finally, and likely more commonly, retirees may have a desire to leave bequests to their children and to charitable institutions. For these and other reasons, the Bengen rule, suitably adjusted for reasonable investment expectations and conservative longevity prospects, may be an appropriate withdrawal method, at least in part.

Still, given that the main purpose of a retirement account is to produce lifetime income during the years of retirement through death, it is hard to argue against a significant and widespread role for immediate life annuities in the production of retirement income, in light of the results presented. Perhaps combination strategies can improve on the use of a life annuity alone. A financial planning paper by Ameriks, Veres, and Warshawsky (2001) begins to address the issue of combination strategies—that is, using both life annuities and systematic withdrawals from an appropriately invested portfolio. These authors make a few adjustments to the standard simulation methodology that examines withdrawals, including considering only the post–World War II period, subtracting 100 basis points from investment returns to account for management and advisory fees, and evaluating withdrawal periods as long as 40 years. Their most significant innovation, however, is to add consideration of the use of an immediate life annuity in the initial portfolio allocation.

In particular, Ameriks, Veres, and Warshawsky use up to half of the initial portfolio (for an individual age 65) to purchase an immediate life annuity, assuming it is priced with a 7 percent interest rate and annuitant mortality. Then income flows from the nominal annuity and portfolio withdrawals are combined to try to reach a goal of 4.5 percent inflation-adjusted continual income. If the retirement investment portfolio is aggressively allocated (85 percent to stock) and the initial allocation of initial resources is 50 percent to the life annuity, an inflation-adjusted income of at least 4.5 percent can be distributed over 35 years in 95 percent of simulations (i.e,, a 5 percent failure rate to age 100 when starting at age 65). Moreover, in only 7.4 percent of simulations does the portfolio fail over 40 years (although failure is not complete because the life annuity continues to pay). These failure rates are substantially lower than if a life annuity is not used (e.g., 11.8 percent over 35 years for a no-annuity case).

Moreover, according to Ameriks, Veres, and Warshawsky, the residual portfolio value is not that much lower for the median simulation—2.28 times the original portfolio value over 35 years with a 50 percent initial allocation to the life annuity, compared with 2.78 with no annuity. This example illustrates well Finke, Pfau, and Blanchett's (2013) speculation that (partial) use of a life annuity in a portfolio may be a worthwhile tradeoff of residual wealth for income and security. It must be cautioned, however, that the assumption by Ameriks, Veres, and Warshawsky of a relatively high point in the interest rate cycle in 2000 (i.e., a low point in the pricing cycle for fixed life annuities) may bias the results somewhat in favor of the annuity. That possibility bears further empirical investigation and a more refined methodology with comprehensive historical data and simulations of annuity pricing, as will be done in this paper.

Warshawsky (2012, chapters 5, 6, and 7) works further on the obvious next phase of analysis—creating strategies that combine laddered purchases of smaller amounts of immediate life annuities over time (i.e., dollar-cost averaging) and different types of systematic withdrawals from a balanced investment portfolio. This more flexible approach is therefore able to take into account the many interests, preferences, and risks present among retired households in optimal and customized ways. The next section gives a more detailed summary of Warshawsky's book and related studies.

B. Different Types of Retirement Income Products and Combination Income, Withdrawal, and Investment Strategies

In Pang and Warshawsky (2009; also Warshawsky 2012, chapter 5), six strategies for producing income and managing wealth in retirement accounts are compared, starting at age 65. These strategies run the spectrum of income, risk, liquidity and bequest potential, and potential growth. At one end, a program of systematic withdrawals as a fixed percentage of an account's balance invested in a mix of bond and equity funds (complete liquidity and growth potential with no guarantees) is examined. At the other end, the complete and immediate annuitization of a retirement account using a straight immediate fixed (nominal) life annuity (no liquidity or growth potential but fully guaranteed) is investigated. In the middle of the spectrum, other strategies examined include a mix of systematic withdrawals and fixed annuitization (either as a one-time split or moving to full annuitization over a period of 10 years—an annuity purchase ladder), a deferred variable annuity with a guaranteed minimum withdrawal benefit (GMWB) rider with a 5 percent withdrawal rate, and an immediate variable life annuity invested in bonds and equities.

These strategies are evaluated in a heuristic manner by examining the statistics of three measures: real (inflation-adjusted) income flows, real remaining balances at death, and the risk of real income shortfall. The statistics are produced through a stochastic simulation model (estimated by using a vector autoregressive process), on the basis of asset returns, inflation rates, and interest rates in the United States from 1962 through 2008. Great care is taken in modeling product specifications, especially as related to fees and costs. In particular, retail-level fees and costs are used for funds and the various annuities. For the variable annuities, there are two or three layers of fees. Fixed annuities are priced quite conservatively, on the basis of Treasury bond yields, annuitant mortality, and an additional load for marketing costs and profits. Comparable to the average asset allocation in target-date funds near the end of their glide paths at age 65, an initial 50/50 equity-bond split is set in the retirement account or variable annuity. In strategies in which the account is partially annuitized, the equity share is increased in the remaining account balance as fixed annuities are purchased to maintain roughly the same overall risk exposure of the retiree.

Focusing on the inflation-adjusted real income produced for surviving account holders (assuming general population mortality rates for 65-year-old gender-neutral individuals with a maximum age of 100), the base comparison is to a 5 percent withdrawal rate from the fund portfolio (chosen because it is also the typical GMWB guaranteed payment at the time of analysis—2007 and 2008). In general, the highest levels of income, with the lowest chance of shortfalls, across the simulations are produced by the strategy that combines systematic withdrawals and gradual but complete annuitization over 10 years—the annuity purchase ladder. Only the fixed annuity produces a higher income, at the median, and that strategy, of course, has no real wealth balances remaining, while the ladder strategy maintains some balances through the first 10 years of retirement. The other strategies (excluding the immediate variable annuity) all have the advantage of significant real balances (i.e., liquidity), but the liquidation value in the deferred variable annuity (VA) with the GMWB tends to run to zero in later life, owing to the force of high fees. A more aggressive portfolio (70/30 equity-bond split) gives a relative boost to the VA + GMWB, as the retired investor takes greater advantage of the insurer's guarantee, but the basic results remain.

The levels of fees are critical to the analysis, but even at an overall lower level—perhaps owing to institutional pricing—as long as fees are held constant in proportion across products and strategies, the advantages of the annuity ladder strategy still hold. The advantages result from the strong possibility that investors might realize the equity premium, as well as ensure the mortality credits increase as age advances, while they minimize management fees and costs. In addition, the use of dollar-cost averaging in the long series of immediate annuity purchases reduces the risk that arises from volatile annuity prices. (See Warshawsky 2012, chapter 2, for evidence on wide and rapid swings in annuity prices even from year to year owing to volatile interest rates.)

In Pang and Warshawsky (2010; also Warshawsky, 2012, chapter 6), a formal stylized model of expected utility maximization in retirement, across income deciles, is used. In the model, the household optimizes consumption and allocates financial wealth across stocks, bonds, and life annuities (priced with loads) in the context of preexisting accrued life annuities already held, such as Social Security benefits and defined benefit pensions. Retirees are exposed to the risks of mortality and uninsured healthcare expenses (mainly long-term care), in addition to facing stochastic capital market returns, and they may have a bequest motive. It would seem logical, and indeed some studies show, that life annuities would be a poor investment in the face of uncertain health-related expenses owing to the lack of liquidity. But it is also a solid empirical finding that exposure to uninsured healthcare expenses is highest later in life, especially for long-term care needs, precisely when immediate life annuities issued at older ages provide their highest returns owing to large and growing mortality credits. Hence, life annuities may be considered as a kind of hedge for healthcare spending in the absence of complete insurance coverage.

Absent a bequest motive, the modeling results are that retired households should start annuitizing their wealth when they are in their mid-70s and annuitize fully by their 80s. Annuity purchases actually continue throughout the remainder of life as retired households save some of their income flows for sequential purchases so as to, effectively, insure for higher healthcare expenses later in life. Moreover, with access to the asset class of guaranteed life annuities, the optimal investment portfolio exposure to equities increases with age, almost to 100 percent for high-income households, until full annuitization occurs and nonannuitized wealth is used up. The consumption path is fairly level over the retirement life cycle, with a slight decline in the 80s and a slight increase in the 90s. The presence of a modest bequest motive tempers these results, but it does not overturn them. In the analysis, sensitivity testing is conducted for alternative-preference parameter values, with both lower risk aversion and lower intertemporal substitution lowering optimal annuity levels. A lower annuity load increases optimal annuity purchases and makes them earlier as well as advising a higher equity share in the portfolio; higher consumption results.

In chapter 7 of Warshawsky (2012), the more primitive analytical methodology of chapter 5 is reprised, with no formal expected utility function used. The focus is now on the annuity ladder strategy, both because it has desirable results in comparison with other strategies and products in chapter 5 and because it closely resembles the optimal results from the theoretical analysis in chapter 6. In particular, the optimal split and timing of systematic withdrawals and laddered immediate life annuity purchases is examined in chapter 7 for both a 65-year-old single and a couple of the same age, as a one-time choice upon retirement. This is essentially the obverse of a target-date fund's glide path. Instead of the expected utility optimization of chapter 6, the choice criterion is to minimize the shortfall risk, defined as the weighted probability of real income and wealth balances falling below certain thresholds. A stochastic simulation model like the one in chapter 5 is again used, but it is now augmented by the addition of data for 2009 and the possibility of rare but severe economic disasters, as actually occurred in the 20th century in many countries, as well as the possible bankruptcies of annuity issuers. The incorporation of these negative events obviously reduces expected returns (and income and balances) and increases risk, particularly in the lower percentiles of the return distribution. The analysis is done on a unisex basis. Emphasis, through the relative weight given to shortfall probabilities, is placed on the production of lifetime real income flows in most of the simulations.

The search for optimal strategy designs includes the withdrawal rate and the length and extent of annuitization. In particular, the laddering can extend for 20, even 30, years here, compared with the 10 years illustrated in chapter 5 of Warshawsky (2012). For an individual age 65, given the previously noted assumptions, the analysis finds that the optimal strategy is to annuitize 10 percent of wealth initially and the remainder over 20 years and to simultaneously take a fixed 5 percent withdrawal from wealth balances while they remain. The equity share increases from 50 percent at age 65 to 100 percent at age 74. This strategy produces the lowest weighted shortfall risk. If annuities are not purchased, the optimal withdrawal from balances is 7 percent, but shortfall risk increases, particularly for income flows. Increasing the initial equity share does not change the optimal strategy much.

Several alternative scenarios and situations are also modeled. If less emphasis is placed on income shortfalls, the optimal initial annuitization is 0 percent at age 65 and increases to 20 percent of wealth by age 70; the optimal equity allocation also increases to only 62.5 percent by age 70, and the withdrawal rate increases to 6 percent. If high priority is given to income production and the initial equity share is larger (70/30), only the initial annuitization percentage changes from the base results—to 15 percent of wealth—and everything else remains the same. If the individual retires at age 60, the optimal annuitization period extends to 25 years; if the individual retires at age 70, the annuitization period remains at 20 years, but the initial annuitization increases to 15 percent.

For couples the optimal strategy is no initial annuitization and a longer annuitization period—30 years. This strategy concurs with the notion that there is some intrafamily mortality risk pooling with a couple and thus slower and lower desired annuitization. The equity share reaches 100 percent at age 80. If there is less emphasis on income production, couples will skip annuitization entirely and withdraw at a 6 percent rate.

In a subsequent analysis done for a regulatory submission to the IRS on proposed changes in the MDR rules to accommodate longevity annuity contracts (Pollack and Warshawsky 2012, appendix), optimal strategies are shown for even more scenarios for couples, including with earlier and later retirement ages and with a younger spouse. The optimal strategies were largely the same, but the ultimate annuitization percentages fell below 100 percent (ranging from 65 to 95 percent) and the annuitization paths were longer (except for those retiring at age 75), because the advantages of loaded annuities were reduced somewhat by relatively lower total mortality credits in the joint-and-50-percent-to-survivor form.

By way of an example, consider a single woman age 65 with $1 million in retirement assets and $14,000 in annual (inflation-indexed) Social Security income. Assume that this individual has a strong desire to leave a bequest to her children but that her first priority is to support her standard of living in retirement. In such a case, the optimal strategy is to take a systematic withdrawal from the balanced mutual fund portfolio of 6 percent annually, to initially annuitize 5 percent of the portfolio, and then to gradually increase the extent of annuitization to 20 percent of wealth over 18 years.

An alternative strategy may be to use Social Security benefits strategically to maximize retirement income. With this strategy, the receipt of Social Security income would be delayed until age 70 so that the maximum (inflation-indexed) annual benefits are received. If retirement occurs earlier than age 70, the individual in the meantime would withdraw assets from her retirement portfolio to finance consumption and any emergencies. To my knowledge, this strategy has not been formally evaluated, and it has several possible drawbacks. For example, the strategy may not be tax efficient in two respects. First, although Social Security retirement benefits are at least partially exempt from income taxes in general, with higher Social Security retirement benefits as well as other taxable income, it is more likely that more of the annual benefits will be taxed at a higher marginal tax rate. In addition, in general it is optimal to defer the distribution of tax-qualified retirement assets to defer their taxation, but the strategy here speeds up taxation. Also, faster use of retirement assets makes the overall strategy more sensitive to market risk and hence less likely to be available for liquidity and bequests. Finally, most retirees, particularly those in lower- and middle-income situations, generally need as much income as possible, as soon as possible, including from Social Security.

Other researchers in the vineyard of retirement income strategies include Dus, Maurer, and Mitchell (2005), who conduct a stochastic simulation analysis of various strategies, including an immediate real (inflation-indexed) annuity, delayed annuitization, and systematic withdrawals. In the latest, the withdrawal rate is determined according to a fixed benefit level paid until the plan participant dies or the funds are exhausted, or according to different variable formulas such as fixed percentages (used in a previous example) or related to life expectancy. These researchers also use an evaluative approach broadly similar to the one used by Warshawsky (2012, chapter 7) and already mentioned—that is, shortfall risk and expected levels of payouts and real balances.

Using German data, Dus, Maurer, and Mitchell find that annuitization is relatively more appealing to older retirees than are phased withdrawals, a result quite similar to the results summarized previously. Building on this observation, they find that a strategy of systematic withdrawals followed by full annuitization at age 75 or 85—delayed annuitization—is superior to other strategies in that it increases the expected present value of benefits and shrinks the expected present-value shortfall of income. This strategy evokes the annuity ladder.

Finally, another strategy that Dus, Maurer, and Mitchell evaluate is for an individual to purchase, at the beginning of the retirement period, a deferred annuity (to begin to pay at age 75 or 85); this is the longevity insurance strategy advocated by some analysts and market participants, as explained further next. Dus, Maurer, and Mitchell find that the outcomes here are generally inferior to delayed immediate annuitization, particularly for longevity insurance at age 85, especially if bequests or liquidity are desired.

Longevity insurance (also known as an advanced-life delayed annuity, or ALDA), which is a deeply deferred straight (no beneficiary) life annuity, is purchased upon retirement and starts to pay at some advanced age (85 is usually mentioned). ALDAs are promoted by Milevsky (2005) and Scott (2008). Indeed, the Obama administration has granted special dispensation from the strictures of the MDRs that apply to qualified retirement assets for ALDAs with deferred payment up to age 85. This dispensation removes the premium for ALDAs from the calculation base for required distributions beginning at age 70.5 subject to the individual income tax. The claimed behavioral advantage of an ALDA is that it provides liquidity through most of the effective retirement period, as well as partial annuitization with fairly good longevity risk coverage for what might be perceived as a cheap price. Sexauer, Peskin, and Cassidy (2012) show that "only" 12 percent of the portfolio of a retired 65-year-old would have been needed in 2010 to purchase a deferred annuity (albeit a nominal one) for the first deferred annuity payout at age 85 to be equal to the last payout from a self-amortizing (over 20 years) portfolio of laddered inflation-protected Treasury securities.

Gong and Webb (2010) examine longevity insurance more formally, comparing it with complete annuitization with a real (inflation-indexed) immediate annuity, postponing complete annuitization to a late age, and systematic withdrawals; they do not, however, consider annuity ladders. Gong and Webb employ an expected utility model, with no risky assets or bequest motive but with the various annuities expense loaded equally. With retirement at age 65 and moderate risk aversion, complete immediate annuitization is found to be preferred to the alternative strategy that includes longevity insurance commencing payment at age 85 because longevity insurance generally has a higher load, as will be discussed next.

C. Loads on Annuity Products

The literature also looks at expense loads to be used in realistic modeling of marketed life annuities. Gong and Webb (2010) calculate expense loads on various commercial annuity products by using data from one day's pricing in January 2008 from a few US insurance companies quoted on an institutional buyer's platform or by the companies directly. They use the standard money's worth methodology of Friedman and Warshawsky (1990) and Mitchell et al. (1999), with various interest rates and mortality tables, and they report on the ratios of calculated value to price by age of the insured at commencement of payment and by type of product. Mitchell et al. find a load of about 10 percent on nominal immediate life annuities issued to a 65-year-old, exclusive of the impact of adverse selection of mortality risks. Looking at the best pricing of immediate annuities by three companies, using Treasury bond yields and general population mortality statistics, Gong and Webb find that the load is about 5 percentage points higher on real annuities than on nominal annuities and that the load is fairly constant across ages 60–75 but increases thereafter, again by about 5 percentage points.

Comparing the loads on longevity insurance (to pay at age 85) with those on immediate annuities, where both products are on a nominal basis and issued at age 65, Gong and Webb find that the load on the deferred annuity is about 5 percentage points higher than for the immediate annuity at one insurance company and about 20–30 percentage points higher at another insurance company. Although these findings may be somewhat delicate given that they reflect pricing on one day, Finkelstein and Poterba (2004) find a similar result for a large UK insurance company over a 17-year issuance period through 1998; that is, the load is from 5 to 10 percentage points higher on real immediate life annuities than on nominal annuities.

III. Required Minimum Distributions

Complex IRS regulations generally state that, after age 70.5, required minimum distributions (RMDs) must be made from all types of qualified retirement plans and accounts (including IRAs), and included in taxable income (and the RMDs increase as age increases). If the RMDs are made through a life annuity, the regulations specify the required features of the annuity. The purpose of these regulations is to try to reduce the use of retirement accounts as vehicles to transfer financial assets across generations without the payment of income taxes.

As mentioned earlier, the Treasury Department has recently made some changes in the MDRs that would encourage longevity insurance—that is, the use of deeply deferred life annuities that begin payments as late as age 85. The policy motivation, as stated in remarks by Treasury officials, is to promote partial annuitization, with the view that plan participants and account holders could be persuaded through somewhat more favorable tax treatment to at least insure the long tail of longevity contingencies. It is unclear, however, why this strategy merits special treatment compared with other partial annuitization schemes, such as laddered purchases of immediate life annuities, which are more comprehensive and efficient. Moreover, the changes add further complexity of a "Swiss cheese" nature to the relevant regulations rather than a much-needed overall simplification and reform of the requirements. Also, both the availability and the pricing of longevity insurance in the commercial market are less favorable than "plain vanilla" immediate life annuities, owing to a greater extent of adverse selection and a lesser extent of issuer competition. Therefore, it is not clear whether alternative income strategies and other regulatory changes were considered when the Treasury Department proposed the new regulatory changes favoring longevity insurance. Preliminary discussions among financial planners seem to indicate that, to the extent it is used at all, the longevity insurance regulation will be used mainly by high net worth individuals seeking to avoid MDRs and the payment of income taxes, although the Treasury Department put some asset level limits on the use of the rule.

The current regulations provide that an RMD is determined by dividing an account's balance by the applicable distribution period, according to a life expectancies table. These expectancies, which represent the retiree and his spouse (who is assumed in the regulations to always be 10 years younger), decline with age. So the RMD starts at less than 4 percent of the account's value at age 71, increases to about 10 percent by age 92, and is about 20 percent by age 103.

Before the recent change in regulation, the value of a deferred annuity's contract before the date that annuity payments commence had to be treated as an account balance. Hence, an individual's RMD for the year was determined by combining the value of the deferred annuity with the value of the individual account. The provisions of the regulations, even after recent changes, however, do not provide consistent treatment for an annuity contract after the date that annuity payments commence (a payout or income annuity). In particular, the current RMD regulations say that annuity distributions satisfy the requirements if the annuity meets certain rules pertaining to the manner in which payments are made, ignoring the value of the annuity. Under these rules, an individual's interest in a payout annuity is treated separately from assets held in an individual account. The one current exception is that annuity payments are counted toward the RMD determined under the individual account rules, but this special rule applies only for the calendar year in which annuity payments commence.

The general inconsistency in the RMD regulations that isolate payout annuities from individual accounts operates to penalize retirees for taking distributions in the form of a life annuity and discourages the use of immediate life annuities to provide retirement income. In particular, many annuity payouts are materially larger in the age range of the 70s and early 80s than the amount that would be required to be distributed under the RMD individual account rules based on the value of the annuity. If an individual has elected a full-payout annuity, that is not a problem because the individual chose that level and tilt of the payout stream, generally meeting the regulatory requirements. But there are many instances in which an individual will optimally want to partially and gradually annuitize an account. In those cases, the regulations can penalize the individual and make more difficult use of the innovative strategies discussed here and illustrated further below.

Assume, for example, that a payout annuity held in a retirement plan account had a commuted value of $10,000 and pays out $840 per year for an individual age 72. Under the RMD individual account rules, the required annual payout would be $391, or $449 less than the total annual annuity payment. If the individual's total account balance is $30,000, under the current RMD regulations the individual must receive the $840 annuity payments plus an additional $781 with respect to the remaining account balance, for a total of $1,621. If the individual has not annuitized, the required total distribution will be only $1,172. This means that by reason of partially annuitizing, the individual would have to speed up payment of income taxes by 38 percent. This is simply inappropriate and is a severe penalty on partial annuitization.

By contrast, an individual selecting a partial annuity payout would not be adversely affected if the RMD regulations were changed so that the individual would determine the RMDs with respect to the "entire interest" in the retirement plan by taking into account the value of a payout annuity under the plan together with the value of the rest of the retiree's balance under the plan. Under this approach, the RMD for a calendar year would be determined by dividing the combined actuarial values of an individual's payout annuities and the rest of the account by the applicable distribution period. The effect of this approach is that the amount of the annuity payouts made in a calendar year, together with the amount of distributions from an individual account in the same year, would count toward the total RMD for the year from the retirement plan.

As noted, current RMD regulations already effectively apply this proposed treatment to a deferred annuity contract and to a payout annuity for the calendar year in which annuity payments commence. This proposed treatment is consistent with the statutory requirement that an individual's RMD with respect to a retirement plan must relate to the individual's entire interest." Hence, applying the individual account treatment to payout annuities would only require a change in regulations and not a change in law.

IV. Empirical Methodology

The empirical methodology used in this paper is the same as that in Warshawsky (2015), using the historical simulation approach commonly found in the financial planning literature. In particular, the analysis in this paper starts with a simple model of life annuity pricing. The focus is on gender-neutral workers who retire at the common ages of 62, 65, and 70. The annual incomes from an immediate life annuity starting at these ages for a $100,000 investment are shown. Annual simulations of the fixed nominal incomes from life annuities illustrated in various years are based on historical yields on constant-maturity 10-year Treasury bonds and unisex mortality tables with a cutoff age of 110. Further annual simulations of real (inflation-adjusted) incomes are based on historical observations of price inflation subsequent to the retirement age and date, 10, 20, 30, and sometimes 35 and 40 years later. To further understanding of the methodology and results, graphs are presented below that illustrate three retirement-year cohorts—1932, 1966, and 1982. Note that deflation is observed in the historical record during the Great Depression of the 1930s and again during the recent Great Recession, and this possibility too is reflected in the calculations.

As mentioned, the model used here for annuity pricing is quite simple. It employs the yield on the 10-year Treasury bond and the unisex annuitant mortality table currently enjoined by the IRS for certain pension and other purposes; the mortality table is a projection 10 years into the future based on estimated current experience. A more sophisticated model might use the entire yield curve on fixed-income securities in which insurance companies invest, including corporate bonds and mortgages (which have higher yields than Treasury bonds), more sophisticated projections of (likely lower) mortality rates into the future using generational tables, estimates of administrative and marketing costs, gender-specific mortality, and so on. Even better would be data on actual historical prices of life annuities that reflect then-current financial conditions. Unfortunately, such data are not available going back so many years; therefore, pricing by model will have to serve. But modeling does have its advantages. Because the focus here is on changes in financial and economic conditions, it is possible to control for changes in mortality rates, which actual pricing data does not. Although unisex pricing is legally relevant and required only by employer-provided plans and by annuity sales in the state of Montana, for ease of exposition it is generally easier to combine male and female rates into a unisex rate—or, doing essentially the same thing, to focus on a joint-and-50-percent-to-survivor life annuity.

The equivalent annual income produced by systematic withdrawal conventions is simulated by using historical observations of asset returns on the Standard & Poor's 500 stock index portfolio and a portfolio of 10-year Treasury bonds, as well as price inflation. In particular, a balanced fund will be modeled, initially with 50 percent equity and 50 percent bonds, with a low-20s basis point investment management fee charged, rebalanced following changes in annual market returns and withdrawals and accounting for purchases of immediate annuities where annuities are regarded as bondlike investments. I begin by reprising the analysis of annual withdrawals following the simple withdrawal rule first put forward by William Bengen (1994) and since advocated by many financial advisors—that is, 4 percent of the initial portfolio value at the point of retirement—which produces a particular dollar amount that is subsequently increased by the actual rate of inflation. Then combination strategies are modeled.

The historical annual asset return and inflation and interest rate data used in this paper come from a public access database made available by Yale University Professor Robert Shiller. (Shiller's data begin with the year 1871, but I use only data starting in 1919, after World War I and the establishment of the Federal Reserve System, through 2013). Bond returns, based on the annual yield for constant-maturity Treasury bonds, are calculated by formula. For most summary statistics of the historical simulations, the full 30-year results end with the retirement cohort year 1983 for a 65-year-old.

The operation of current and proposed RMD rules is also illustrated here by using these historical simulations for several examples of partial annuitization combination strategies. In particular, the number of years that the strategies meet the rules and the size of the shortfall in various durations and accumulated over the years when the strategies do not meet the regulatory requirements are tabulated over the historical record, for both current and proposed RMD regulatory regimes.

V. Empirical Results for Retirement Income Strategies

Table 1 (page 36) repeats results from Warshawsky's (2015) model calculations, on a basis comparable to the literature cited above for the Bengen withdrawal rule. For cohorts retiring from 1919 through 1983, results of historical model simulations are examined for year 1, year 10, year 20, and year 30 inflation-adjusted annual incomes produced from various immediate life annuities issued at the historically standard retirement age of 65, under the Bengen rule, for a $100,000 account. The portfolio failure rate for the Bengen rule is given, as well as the remaining fund balances at various percentiles. Table 1 also reports the mean and various percentiles of the range of historical experiences for each strategy.

The first panel of table 1 shows that in the first year of retirement, for any type of annuity and in any economic scenario, the immediate life annuity provides higher annual income than under the Bengen withdrawal rule. The range of initial incomes from the immediate annuity across scenarios arises from different interest rates, with high interest rates producing more income. The Bengen rule, of course, preserves a fund balance, but the balance amount does vary with market performance, even as the payout amount remains constant. The question of where to focus attention in terms of annuity type depends on the personal situation of the retired household—whether an individual or a couple and, if the latter, the spending needs of the survivor. The operation of the Bengen rule is invariant to these considerations, but any evaluation should hold them in mind; in particular, for a couple the planning horizon needs to be longer, and the portfolio exhaustion date later, than for an individual.

The second panel in table 1 lists the range of income outcomes 10 years into retirement in inflation-adjusted terms. Historical inflation rates are variable and, with nominal fixed life annuities, produce variable real income flows. Recall that during this period a few years even saw deflation, which is favorable to any fixed-income instrument, whereas some years had high inflation rates. In most scenarios and circumstances, the immediate annuity still gives a higher level of inflation-adjusted income than does the Bengen withdrawal rule. We also begin to see a significant divergence in fund balances for the latter approach, from $50,000 in the 10th percentile to nearly $180,000 in the 90th percentile.

The third panel shows income outcomes 20 years into retirement in inflation-adjusted terms. Although the mean and upper percentiles still demonstrate a higher flow from the immediate annuity, in the lower percentiles the force of inflation is evident, with income falling below the Bengen withdrawal rule level of $4,000. Moreover, there have been no portfolio exhaustions in this horizon, although the beginning of such an outcome can be seen with the 10th percentile fund balance, which is only $23,000.

The last panel in table 1 shows inflation-adjusted outcomes 30 years into retirement, the traditional end for financial planning (although for a 65-year-old couple, there is nearly a one-in-five probability of one person surviving past the age of 95). Just as aging breaks down the human body, the continued onslaught of financial risks, such as inflation and volatility in market returns, takes its toll on the life annuity. Although the life annuity continues to pay out a steady stream of fixed nominal income, inflation has eroded it in most scenarios and circumstances to about one-half to two-thirds its initial level. For many retirees, some diminution in regular desired spending does occur with age, but over time healthcare costs, especially for long-term care, rise with age, and these costs should be covered. The Bengen withdrawal rule also suffers in the long run, with a portfolio exhaustion rate of 11 percent and little or no income then available to individuals surviving to age 95, a demographic outcome that is expected for at least one member in about one-fifth of couples. The Bengen rule, as traditionally constituted, does not operate well for extended periods, whereas a life annuity has the advantages of higher income flows in the first half or so of retirement years and continued income flows regardless of life contingencies and asset returns.

Now, in new analysis, let's consider how a combination strategy will fare. In particular, as an example of an optimal strategy for a retired household, an initial purchase of an immediate life annuity is modeled by using 15 percent of wealth balances ($15,000 from a $100,000 account), and then further small purchases of life annuities are made over 20 years until 25 percent of projected wealth is annuitized. Alongside these laddered annuity purchases, which represent a type of dollar-cost averaging and therefore hedging of pricing risk, the retired household withdraws 4.75 percent of wealth balances annually and simultaneously reallocates investments so as to keep to the initial allocation, counting life annuities as fixed-income instruments (see table 2, page 38). Note that this is only one implementation of the type of combination strategy I propose; other implementations, say with longer or lower annuitization paths or higher or lower withdrawal rates, may be best in particular situations to meet specific goals and preferences of a retired household.

In the first panel of table 2, representing the range of experiences for the first year of retirement, in the partial annuitization combination strategy about $1,000 in income comes from a life annuity and about $4,000 comes from systematic withdrawals, totaling about $5,000. Although this is less income than what complete and total annuitization would bring (about $2,500 less), it is about $1,000 more than the Bengen withdrawal rule produces, and the remaining retirement account balances are still quite significant, at $85,000 on average, representing considerable liquidity for emergencies and an eventual bequest.

In the second panel, representing the range of experiences in inflation-adjusted terms for the 10th year of retirement, outcomes widen in the combination strategy for both annual real income flows and wealth balances. Income ranges from $3,000 to $7,500, with a bit more dependency on life annuity payouts, and balances range from $43,000 to $127,000. (Note that income from annuities and distributions from the account balances sum to total income only at the mean because the percentile results are reported for each individual cell.) Still, the averages and medians of the combination strategy are nearly unchanged from the amounts in the first year of retirement, despite the passage of nine years, distributions for purchases of life annuities and for income from retirement accounts, ups and downs of the markets, and gradual degradation as a result of inflation. Moreover, the average income deficit compared to complete and total annuitization has shrunk to less than $1,000, and the average income surplus compared to that under the Bengen withdrawal rule remains about $1,000. Again, the partial annuitization combination strategy preserves liquidity and bequest possibilities well, compared to total annuitization.

In the third panel, representing the range of experiences in inflation-adjusted terms for year 20 of retirement (age 85), some of the real strength of the combination strategy is beginning to be seen. Average income, at $5,400, increases somewhat compared to year 10 and is now $1,100 higher in real terms than complete and total annuitization and about $1,400 higher than with the Bengen withdrawal rule. In some outcomes, where investments performed well and inflation was relatively tame, income is almost $9,500 and wealth balances are $143,000—excellent results. Even in bad times income levels remained healthy and balances remained significant, especially considering the passage of time, inflation, and so forth. Moreover, the range of experiences is generally narrower (i.e., less risky) compared with that produced by the Bengen rule, particularly in terms of remaining balances.

The fourth panel of table 2, representing the range of experiences in inflation-adjusted terms for year 30 of retirement (age 95), is the ultimate test of a strategy. Here, the true superiority can be seen of the combination strategy compared with complete and total annuitization and the Bengen withdrawal rule. Average income and income across all experience percentiles are significantly higher than with complete and total annuitization in inflation-adjusted terms, while large balances remain, again on average and across the various percentiles. Compared with the Bengen rule, in year 30 there is no risk of running out of money and real income is higher on average and in most percentiles. The fixed-percentage approach of the combination strategy compared to the fixed-dollar (inflation-indexed) approach of the Bengen rule gives lower risk overall, and the bulwark of the life annuity payouts, even degraded by inflation, helps too. Although no doubt the combination strategy can and should be refined to get the optimal mix of outcomes across various environments to reflect a retired household's goals and preferences, the general superiority of the combination strategy is evident.

By way of further illustration of these results, figures 1–3 (pages 40–42) show three specific cohorts: retirement at age 65 in 1932, 1966, and 1982, comparing lifetime inflation-adjusted annual incomes from a joint-and-50-percent-to-survivor immediate life annuity and a combination strategy and showing the remaining account balances under the combination strategy. For the 1932 and 1966 cohorts, "lifetime" means a horizon through 35 years (i.e., age 100); for the 1982 cohort, only a 30-year horizon is available. These three illustrations show a wide range of outcomes, reflecting the different historical experiences with interest rates, inflation rates, and asset returns, which, of course, are included in the summary statistics.

To round out the analysis, let's consider an earlier retirement age, 62, which is still quite common today in the United States, with many people claiming their Social Security retirement benefits at the first opportunity. Here we really must extend the horizon of analysis to 40 years, to age 102, to avoid the substantial demographic risk of survival past the planning period. Unfortunately, this extension reduces the number of cohorts that can be examined with the historical record (i.e., only the cohorts retiring through 1973), so the results here are not totally comparable to those reported above. In the interest of brevity, I show and describe the percentile results only for year 40 in table 3 (page 43). The particular implementation of the combination strategy illustrated here puts a slightly heavier emphasis on income than do the prior implementations, with annuitization starting at 10 percent of wealth and ramping up to 30 percent over 25 years and a withdrawal rate of 4.5 percent.

Over this extended horizon, recall from Warshawsky (2015) that the Bengen withdrawal rule fails almost 35 percent of the time. This should be an entirely unacceptable outcome to financial advisers and other retirement experts, and it means that the withdrawal rate should be reduced significantly from 4 percent. Income from a life-annuity-only strategy initially is simulated to be at a lower level than if payout had begun at a later age because of the longer life expectancy at a younger age. Moreover, inflation has a larger opportunity over time to eat away at real income flow. Still, the flow does continue for life. The combination strategy provides a lifetime income flow that is at least somewhat hedged against inflation (because of laddering), has some upside potential, and leaves some remaining balances upon death. In particular, in year 40 of the strategy, at age 102 (within the reasonable realm of survival for at least one of a couple nowadays), the mean inflation-adjusted income is $4,500, ranging from $2,600 to $8,700, which is well above the inflation-degraded course of complete and total annuitization. The combination strategy gives remaining balances averaging $76,000, ranging from $42,000 to over $150,000—not bad after 40 years.

VI. Empirical Analysis for RMD Rules and the Proposed Alternatives

Here, I examine the extent to which the combination strategies illustrated previously meet current RMD rules and revised rules proposed in this paper. In particular, I measure the number of years that the strategies meet the rules and, when the strategies do not, the size of the shortfalls. I illustrate that the proposed rules are easier to meet and have a smaller shortfall when not met, thereby encouraging the use of combination strategies, which, of course, are a type of partial annuitization, the Obama administration's overall policy goal. Because the proposed

RMD rules would not change for systematic withdrawal strategies such as the Bengen rule, they would have no effect on non-annuity strategies.

Let's start with a simple illustration of the difference between the current and proposed RMD rules by considering the 1966 cohort experience for an individual who retired at age 65 through to age 95, a duration of 30 years. Figure 4 (page 44) shows the shortfalls of income produced by the combination strategy compared with the RMDs under current and proposed rules; that is, the figure demonstrates the RMD experiences equivalent to the simulated historical outcomes of the combination strategy shown in figure 2.

For the first seven years after age 70.5, under current RMD rules, there is no shortfall because the combination strategy, with its systematic withdrawals at 4.75 percent and annual annuity purchases, is providing enough income to satisfy even the increasing requirements. But then an increasing shortfall results, and according to the historical experience, the retiree will have to take a distribution of almost $15,000 more (in nominal terms) than the income of the combination strategy by 1996, when he or she turns 95. By contrast, in the proposed RMD rules, there is no shortfall for 12 years after turning 70.5, and the annual shortfall, when it occurs, is reduced, on average, by $1,500 compared with current rules, and the total shortfall through age 95 is reduced by about $20,000. Clearly, the proposed RMD rules would provide a tax-related incentive for partial annuitization combination strategies not currently present in the IRS retirement regulation.

Now let's expand the scope of analysis to consider the full historical record, again for a 65-year-old retiree using the combination strategy given above. Table 4 (page 45) shows the distribution of experiences under current and proposed RMD rules, simulated over the 1919–2013 historical record, 20 and 30 years after the individual retires at age 65. (The 10-year duration is uninteresting because at age 75, in all historical scenarios and for both current and proposed rules, the RMD is satisfied.) The variability in overall results owes to the ups and downs in asset returns, life annuity prices, and fixed annuity incomes over the years, while the differences over the years in results between the two sets of RMD rules are mainly owing to variability in the pricing of annuities and the incomes produced from them.

Looking at the current rules, for the 20-year duration (through age 85), the RMD is consistently missed for eight years for the combination strategy, while for the 30-year duration (through age 95) the RMD is consistently missed for 18 years. After 20 years, the nominal dollar annual RMD shortfall ranges from about $1,500 to $3,600, averaging $2,500, while the total dollar shortfall through that year ranges from about $6,000 to about $14,000, clearly mainly dependent on the wide variability in historical asset returns. After 30 years, the nominal dollar annual RMD shortfall increases with higher RMDs, ranging from about $9,000 to about $19,000 (averaging $14,000), and the total dollar shortfall through that year ranges from about $58,000 to about $118,000.

By contrast, the proposed RMD rules would cut the number of shortfall years and nominal dollar shortfall amounts, particularly in the periods of poor asset and annuity performance, a desirable result. For the 20-year duration (through age 85), the RMD is missed for three to seven years, or a bit less than five years on average—that is, somewhat more than three years less than under current rules. Similarly, the proposed rules ease up on the RMD dollar shortfall. In the 20th year, for the proposed rules, the RMD nominal dollar annual shortfall ranges from about $500 to $2,900 (averaging $1,500), about $1,000 less than under current rules, while the total dollar shortfall through that year ranges from about $900 to about $10,000, about $5,000 in total less than current rules demand. In the 30th year, the RMD nominal dollar annual shortfall still increases with higher RMDs, but under the proposed rules by $1,000 annually and about $15,000 less in total than under current rules.

Finally, for completeness, let's evaluate the effect of a reform of the RMD rules with another example of the combination strategy used previously for a 62-year-old retiree. Recall that this example of the strategy places more weight on income production than do the others illustrated here, and so in general the RMD rules will be met more easily overall. Table 5 (page 46) shows the range of historical experiences for the RMD rules, current and proposed, for the 30-year duration, at age 92.

Here, it is seen that the proposed RMD rules have an even larger effect than illustrated in table 4, more significantly reducing the number of years and the dollar amount of the RMD shortfall. With this particular example of a combination strategy, the proposed rules reduce the number of years of the RMD shortfall by four and half years, on average, by about $2,000 annually, and by more than $20,000 total over the 30-year duration shown here for the historical simulation.

VII. Conclusion

Strategies for the purchase of laddered immediate life annuities combined with asset withdrawals represent an excellent way for retirees to manage their assets to enjoy lifetime incomes in a flexible manner while maintaining asset growth, liquidity, and bequest potentials. Simulations show that even at age 95 a retiree who has used partial annuitization combination strategies will get higher income, in inflation-adjusted terms, on average and across most scenarios than with full and complete annuitization or under the Bengen withdrawal rule. Moreover, a significant fund balance remains at age 95; the balance is not as large as with the Bengen rule, on average, but it has a lower risk of running out of assets.

The MDRs that govern tax-qualified retirement accounts for older retirees should be reformed to encourage the use of partial annuitization combination strategies. The reform proposed here, to include the actuarial value of immediate annuities paying out income in the value of a retirement account subject to the more lenient asset-based distribution rules, would reduce the number of years and the shortfall amounts of total income compared with the amount currently required to be distributed. In the example given in this paper for retirement beginning at age 65 through to age 95, the number of shortfall years would be reduced by about three, and the aggregate amount of shortfall would be reduced by about 20 percent.

This broader reform of the RMD rules should to be done for the same reason that the Obama administration made an exception to the rules for longevity insurance—to achieve the reasonable public policy goal of encouraging the use of partial annuitization by retirees. Longevity insurance is a specific and more highly loaded product that seems to have more appeal to wealthy retirees, whereas combination strategies can be designed to fit any income and asset level. Although it is true that combination strategies have yet to be brought formally to the market, there is currently no reason why they cannot be introduced in a convenient package by financial organizations or through financial advisors, and more favorable income tax treatment would surely encourage that outcome.

References

Ameriks, John, Robert Veres, and Mark Warshawsky. 2001. “Making Retirement Income Last a Lifetime.” *Journal of Financial Planning* (December): 60–76.

Bengen, William P. 1994. “Determining Withdrawal Rates Using Historical Data.” *Journal of Financial Planning* (October): 171–80.

Dus, Ivica, Raimond Maurer, and Olivia S. Mitchell. 2005. “Betting on Death and Capital Markets in Retirement: A Shortfall Risk Analysis of Life Annuities versus Phased Withdrawal Plans.” *Financial Services Review* 5: 169–96.

Finke, Michael, Wade D. Pfau, and David M. Blanchett. 2013. “The 4 Percent Rule Is Not Safe in a Low-Yield World.” *Journal of Financial Planning* (June): 46–55.

Finkelstein, Amy, and James Poterba. 2004. “Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market.” *Journal of Political Economy* 112 (1): 183–208.

Friedman, Benjamin M., and Mark J. Warshawsky. 1990. “The Cost of Annuities: Implications for Saving Behavior and Bequests.” *Quarterly Journal of Economics,* 105: 135–54.

Gong, Guan, and Anthony Webb. 2010. “Evaluating the Advanced Life Deferred Annuity—An Annuity People Might Actually Buy.” *Insurance: Mathematics and Economics* 46 (1): 210–21.

Milevsky, Moshe A. 2005. “Real Longevity Insurance with a Deductible: Introduction to Advanced-Life Delayed Annuities (ALDA).” *North American Actuarial Journal* 9 (4): 109–22.

Mitchell, Olivia S., James Poterba, Mark J. Warshawsky, and Jeffrey R. Brown. 1999. “New Evidence on the Money’s Worth of Individual Annuities.” *American Economic Review* 89: 1299–318.

Pang, Gaobo, and Mark J. Warshawsky. 2009. “Comparing Strategies for Retirement Wealth Management: Mutual Funds and Annuities.” *Journal of Financial Planning* 22 (8): 36–47.

———. 2010. “Optimizing the Equity-Bond-Annuity Portfolio in Retirement: The Impact of Uncertain Health Expenses.” *Insurance: Mathematics and Economics* 46 (1): 198–209.

Pollack, Michael F., and Mark J. Warshawsky. 2012. Letter on behalf of Towers Watson to the Internal Revenue Service regarding longevity annuity contracts in response to request for public comments and public hearing, May 2.

Scott, Jason S. 2008. “The Longevity Annuity: An Annuity for Everyone?” *Financial Analysts Journal* 64 (1): 40–48.

Sexauer, Stephen C., Michael W. Peskin, and Daniel Cassidy. 2012. "Making Retirement Income Last a Lifetime." *Financial Analysts Journal* 8 (1): 74–84.

Warshawsky, Mark J. 2012. *Retirement Income: Risks and Strategies*. Cambridge, MA: MIT Press.

Warshawsky, Mark J. 2015. "Government Policy on Distribution Methods for Assets in Individual Accounts for Retirees: Life Income Annuities and Withdrawal Rules." Mercatus Working Paper. Mercatus Center at George Mason University, Arlington, VA. Published as "Distribution Methods for Assets in Individual Accounts for Retirees: Life Income Annuities and Withdrawal Rules" in *Journal of Retirement* 3 (2): 105–22.

Table 1. Means and Percentiles of Inflation-Adjusted Annual Income Produced by Immediate Life Annuities and the Bengen Withdrawal Rule from $100,000 Individual Account, Historical Simulations of Cohorts Retiring at Age 65 from 1919 through 1983, in Years 1, 10, 20, and 30 after Retirement

Year 1

	Immediate Life Annuity Normal Retirement Age				Bengen Withdrawal Rule	
Statistic	Single Life	50% J&S	66.67% J&S	100% J&S	Payout Amount	Fund Balance
Mean	$7,509	$7,509	$7,122	$6,459	$4,000	$100,528
10th percentile	$6,184	$6,184	$5,808	$5,176	$4,000	$86,394
25th percentile	$6,466	$6,466	$6,084	$5,434	$4,000	$91,905
Median	$7,214	$7,214	$6,817	$6,141	$4,000	$100,212
75th percentile	$8,132	$8,132	$7,720	$7,010	$4,000	$108,045
90th percentile	$9,310	$9,310	$8,926	$8,246	$4,000	$116,128
Failure %	N/A	N/A	N/A	N/A	N/A	0.00%

Year 10

	Immediate Life Annuity Normal Retirement Age				Bengen Withdrawal Rule	
Statistic	Single Life	50% J&S	66.67% J&S	100% J&S	Payout Amount	Fund Balance
Mean	$5,905	$5,905	$5,595	$5,065	$4,000	$110,010
10th percentile	$3,976	$3,976	$3,772	$3,412	$4,000	$50,570
25th percentile	$4,486	$4,486	$4,245	$3,834	$4,000	$77,062
Median	$5,282	$5,282	$4,980	$4,468	$4,000	$100,867
75th percentile	$7,331	$7,331	$7,035	$6,368	$4,000	$144,640
90th percentile	$8,997	$8,997	$8,532	$7,812	$4,000	$177,739
Failure %	N/A	N/A	N/A	N/A	N/A	0.00%

Year 20

	Immediate Life Annuity Normal Retirement Age				Bengen Withdrawal Rule	
Statistic	Single Life	50% J&S	66.67% J&S	100% J&S	Payout Amount	Fund Balance
Mean	$4,240	$4,240	$4,018	$3,638	$4,000	$120,294
10th percentile	$2,477	$2,477	$2,350	$2,127	$4,000	$23,123
25th percentile	$2,987	$2,987	$2,856	$2,606	$4,000	$51,199
Median	$3,551	$3,551	$3,335	$2,976	$4,000	$103,287
75th percentile	$4,500	$4,500	$4,330	$4,026	$4,000	$151,742
90th percentile	$7,246	$7,246	$6,852	$6,179	$4,000	$259,400
Failure %	N/A	N/A	N/A	N/A	N/A	0.00%

Year 30

	Immediate Life Annuity Normal Retirement Age				Bengen Withdrawal Rule	
Statistic	Single Life	50% J&S	66.67% J&S	100% J&S	Payout Amount	Fund Balance
Mean	$2,896	$2,896	$2,746	$2,489	$3,482	$115,148
10th percentile	$1,618	$1,618	$1,528	$1,375	$127	$127
25th percentile	$1,832	$1,832	$1,722	$1,550	$4,000	$26,242
Median	$2,415	$2,415	$2,268	$2,040	$4,000	$81,200
75th percentile	$3,703	$3,703	$3,491	$3,133	$4,000	$189,818
90th percentile	$4,815	$4,815	$4,559	$4,121	$4,000	$252,618
Failure %	N/A	N/A	N/A	N/A	N/A	10.77%

Note: J&S = joint and survivor; N/A = not applicable.

Source: Mark J. Warshawsky, "Government Policy on Distribution Methods for Assets in Individual Accounts for Retirees: Life Income Annuities and Withdrawal Rules" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2015).

Table 2. Means and Percentiles of Inflation-Adjusted Annual Income Produced by Combination Strategy from $100,000 Individual Account, Historical Simulations of Cohorts Retiring at Age 65 from 1919 through 1983, in Years 1, 10, 20, and 30 after Retirement

Year 1

	Combination Strategy				
Statistic	Total Payment	Fund Balance	Annuity Payment	Fund Payment	Combo Less Annuity Only
Mean	$5,022	$85,314	$993	$4,028	−$2,488
10th percentile	$4,341	$72,277	$796	$3,409	−$4,194
25th percentile	$4,680	$77,917	$835	$3,675	−$3,140
Median	$5,025	$84,612	$944	$3,995	−$2,139
75th percentile	$5,347	$91,897	$1,078	$4,339	−$1,422
90th percentile	$5,764	$99,242	$1,269	$4,689	−$1,092

Year 10

	Combination Strategy				
Statistic	Total Payment	Fund Balance	Annuity Payment	Fund Payment	Combo Less Annuity Only
Mean	$5,155	$85,183	$1,138	$4,017	−$751
10th percentile	$2,920	$42,658	$753	$2,002	−$1,953
25th percentile	$3,902	$63,373	$880	$2,982	−$1,593
Median	$4,927	$79,622	$1,023	$3,753	−$743
75th percentile	$6,424	$108,700	$1,411	$5,122	$211
90th percentile	$7,477	$127,393	$1,724	$6,008	$863

Year 20

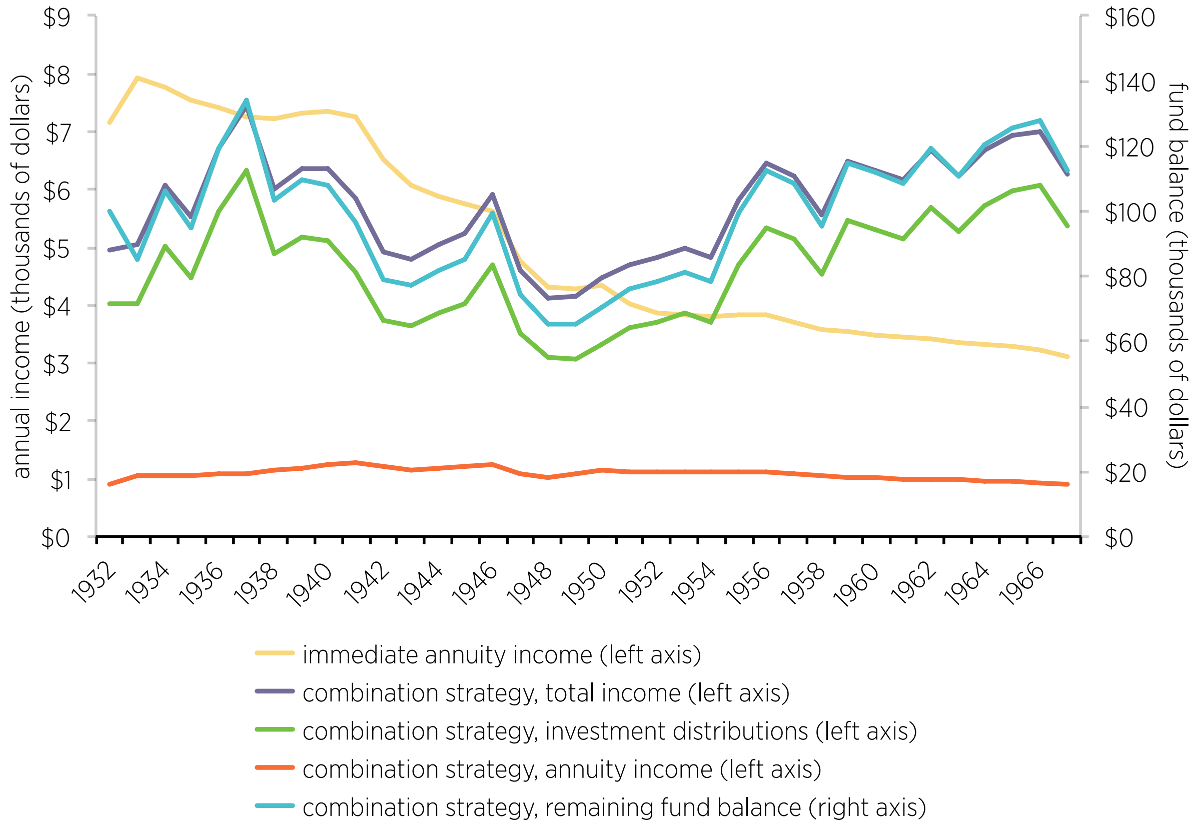
	Combination Strategy				
Statistic	Total Payment	Fund Balance	Annuity Payment	Fund Payment	Combo Less Annuity Only
Mean	$5,381	$82,993	$1,473	$3,907	$1,141
10th percentile	$2,513	$31,682	$901	$1,476	−$741
25th percentile	$3,680	$46,877	$995	$2,198	−$299
Median	$4,866	$81,832	$1,214	$3,854	$966
75th percentile	$6,439	$109,828	$1,689	$5,192	$2,098
90th percentile	$9,481	$142,731	$2,559	$6,723	$3,300

Year 30

	Combination Strategy				
Statistic	Total Payment	Fund Balance	Annuity Payment	Fund Payment	Combo Less Annuity Only
Mean	$4,758	$78,751	$1,017	$3,741	$1,862
10th percentile	$2,623	$42,860	$585	$2,036	$619
25th percentile	$2,903	$48,873	$633	$2,321	$1,005
Median	$4,705	$77,816	$816	$3,696	$1,700
75th percentile	$6,154	$99,407	$1,316	$4,722	$2,657
90th percentile	$6,921	$117,940	$1,681	$5,602	$3,412

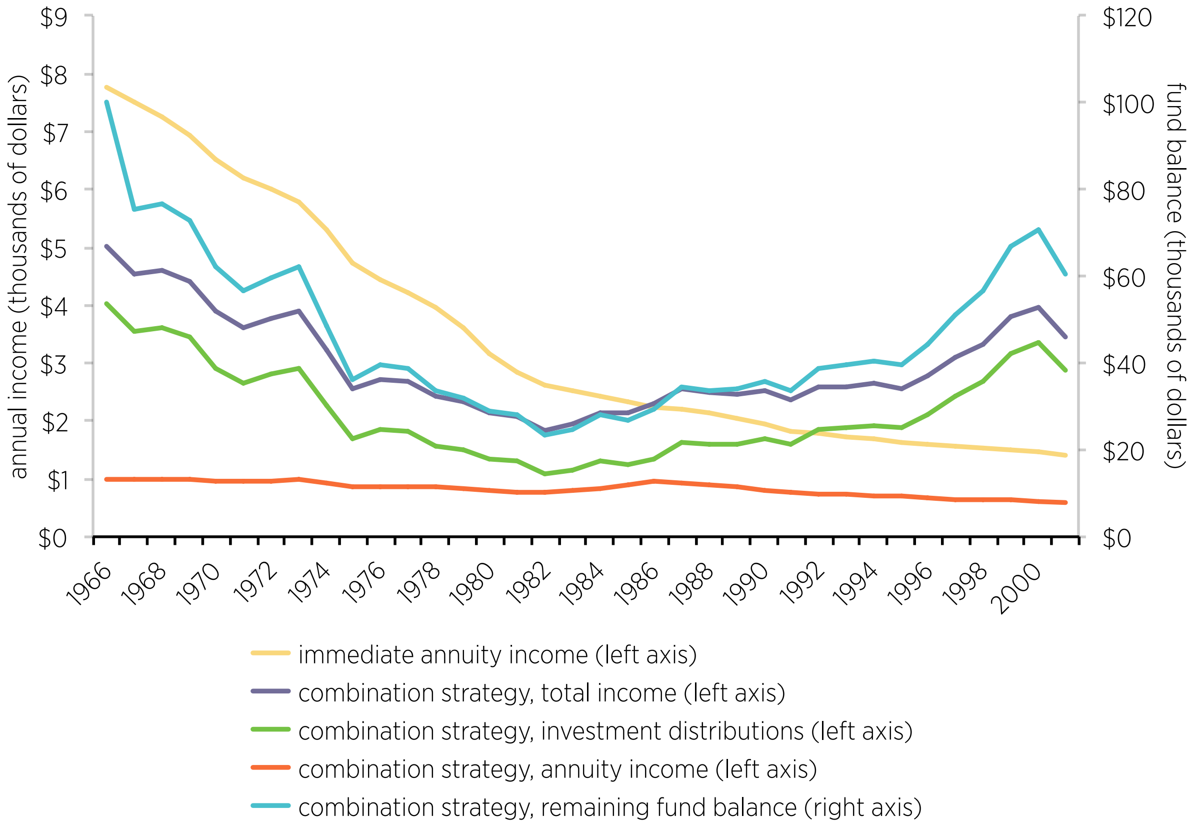
Source: Author's calculations.

Figure 1. Lifetime Inflation-Adjusted Income Following Retirement at Age 65 in 1932: Immediate Annuity vs. Combination Strategy, and Fund Balance



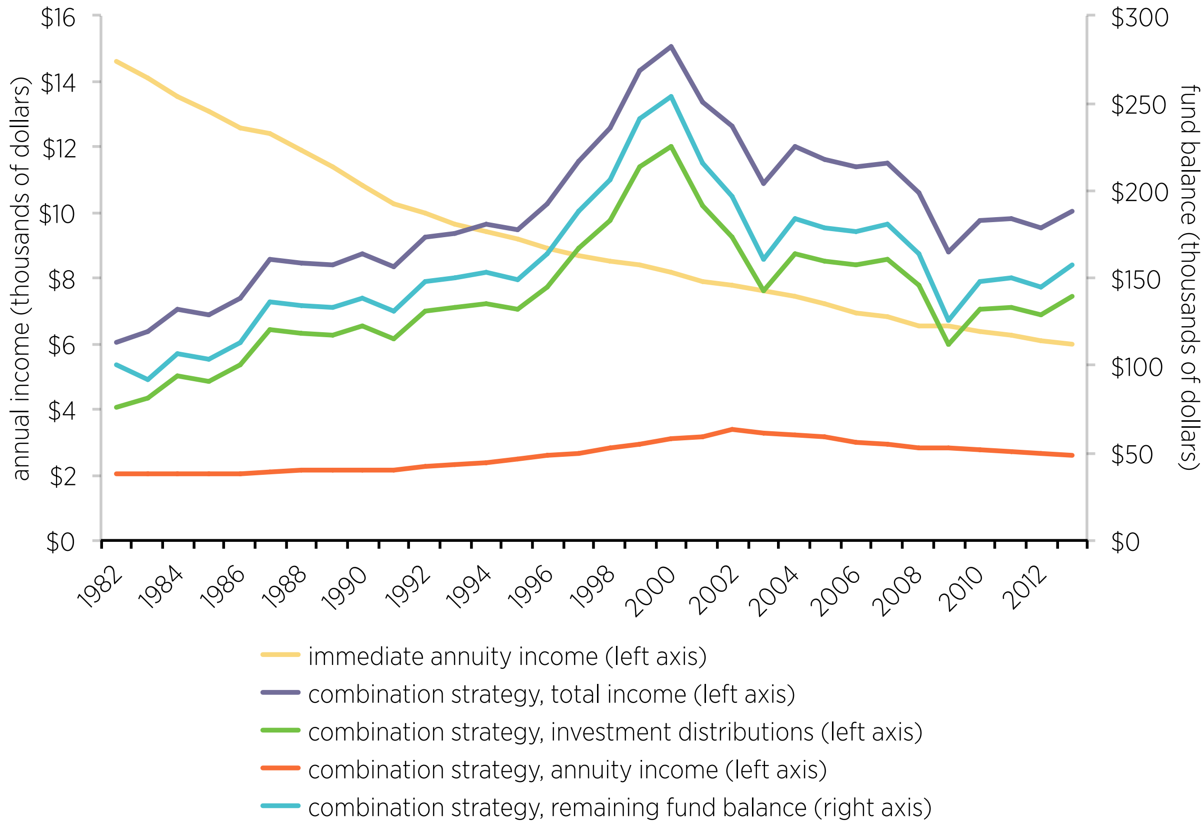
Source: Author's calculations.

Figure 2. Lifetime Inflation-Adjusted Income Following Retirement at Age 65 in 1966: Immediate Annuity vs. Combination Strategy, and Fund Balance



Source: Author's calculations.

Figure 3. Lifetime Inflation-Adjusted Income Following Retirement at Age 65 in 1982: Immediate Annuity vs. Combination Strategy, and Fund Balance



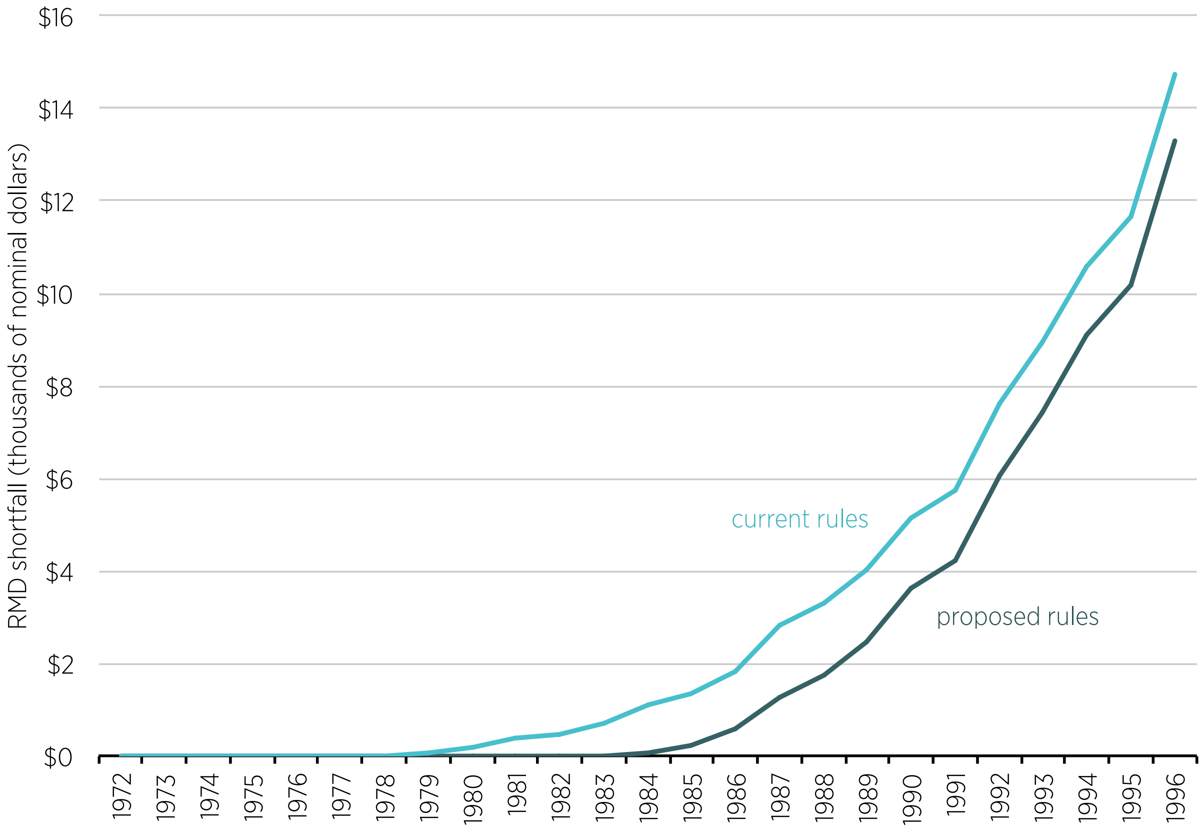
Source: Author's calculations.

Table 3. Means and Percentiles of Inflation-Adjusted Annual Income Produced by Combination Strategy from $100,000 Individual Account, Historical Simulations of Cohorts Retiring at Age 62 from 1919 through 1973, in Year 40 after Retirement

	Combination Strategy				
Statistic	Total Payment	Fund Balance	Annuity Payment	Fund Payment	Combo Less Annuity Only
Mean	$4,515	$75,704	$1,108	$3,407	$2,684
10th percentile	$2,556	$42,453	$514	$1,910	$1,428
25th percentile	$2,989	$46,986	$674	$2,114	$1,747
Median	$3,823	$62,979	$929	$2,834	$2,342
75th percentile	$4,454	$76,523	$1,567	$3,444	$2,969
90th percentile	$8,677	$150,406	$1,906	$6,768	$4,876

Source: Author's calculations.

Figure 4. RMD Shortfalls at Age 70.5 Onward, Following Retirement at Age 65 in 1966, under Combination Strategy: Current vs. Proposed RMD Rules



Note: RMD = required minimum distribution.

Source: Author's calculations.

Table 4. RMD Shortfalls, Number of Years, and Nominal Dollar Amounts, Annual and Total, for Age 65 Retiree under Combination Strategy

Year 20

	Number through Duration		$ in Last Year of Duration		$ Total through Duration	
Statistic	Curr. Rules	Prop'd Rules	Curr. Rules	Prop'd Rules	Curr. Rules	Prop'd Rules
Mean	8.00	4.80	$2,468	$1,517	$9,389	$4,327
10th percentile	8.00	3.00	$1,484	$480	$5,857	$867
25th percentile	8.00	3.00	$1,698	$720	$6,340	$1,667
Median	8.00	5.00	$2,426	$1,177	$8,844	$3,061
75th percentile	8.00	6.00	$3,332	$2,272	$11,869	$6,862
90th percentile	8.00	7.00	$3,624	$2,921	$14,263	$9,905

Year 30

	Number through Duration		$ in Last Year of Duration		$ Total through Duration	
Statistic	Curr. Rules	Prop'd Rules	Curr. Rules	Prop'd Rules	Curr. Rules	Prop'd Rules
Mean	18.00	14.80	$13,703	$12,651	$84,745	$68,652
10th percentile	18.00	13.00	$9,353	$8,483	$58,253	$43,352
25th percentile	18.00	13.00	$10,686	$9,742	$65,692	$50,249
Median	18.00	15.00	$12,306	$11,447	$78,539	$60,246
75th percentile	18.00	16.00	$14,906	$14,046	$99,842	$85,942
90th percentile	18.00	17.00	$19,105	$17,867	$117,976	$105,001

Note: RMD = required minimum distribution; Curr. Rules = current RMD rules; Prop'd Rules = RMD rules proposed in this paper.

Source: Author's calculations.

Table 5. RMD Shortfalls, Number of Years, and Nominal Dollar Amounts, Annual and Total, for Age 62 Retiree under Combination Strategy

Year 30

	Number through Duration		$ in Last Year of Duration		$ Total through Duration	
Statistic	Curr. Rules	Prop'd Rules	Curr. Rules	Prop'd Rules	Curr. Rules	Prop'd Rules
Mean	16.47	12.09	$9,936	$7,926	$57,392	$36,880
10th percentile	16.00	9.00	$6,693	$4,957	$37,255	$16,834
25th percentile	16.00	10.00	$8,064	$5,801	$44,512	$22,295
Median	16.00	12.00	$8,881	$7,094	$49,149	$30,061
75th percentile	17.00	14.00	$11,466	$9,333	$70,849	$50,698
90th percentile	17.00	15.00	$14,050	$11,999	$85,904	$64,079

Note: RMD = required minimum distribution; Curr. Rules = current RMD rules; Prop'd Rules = RMD rules proposed in this paper.

Source: Author's calculations.