Annuities in the Context of Defined Contribution Plans

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Michael J. Brien, PhD
Deloitte Financial Advisory Services LLP
202-378-5096
michaelbrien@deloitte.com

Constantijn W.A. Panis, PhD
Advanced Analytical Consulting Group Inc
424-785-1383
stanpanis@aacg.com

INTRODUCTION

Over the past few decades, many employers have moved away from defined benefit ("DB") pension plans to offer 401(k) or other defined contribution ("DC") plans instead. DB and DC plans differ, among others, in the allocation of such risks as job turnover risk, investment risk, and longevity risk. For example, a DB plan generally pays a fixed benefit for the life of a retired worker, irrespective of investment market fluctuations before or after retirement. This implies that the investment and longevity risks are borne by the plan and not the retiree. In contrast, a retired worker who draws from his DC plan shoulders both investment and longevity risks himself.[1]

Individual retirees are not necessarily well-equipped to manage investment and longevity risks on their own. However, they may be able to purchase an annuity and thereby transfer some or all investment and longevity risks to an insurance company. An annuity is a financial product that promises a periodic payment, typically over the course of the annuitant's life, in exchange for a lump sum premium.[2]

In a prior study, Panis (2004) found that beneficiaries of lifelong-guaranteed income—such as from a privately-purchased annuity or a DB pension, but not from Social Security—were more satisfied in retirement and suffered from fewer depression symptoms than those without such income. These findings were robust to a multitude of refinements, including joint controls for health status, household income, and marital status. Moreover, the boost in well-being became stronger with duration since retirement date. This finding is consistent with the notion that retirees who rely on finite savings and DC plan assets grow increasingly worried about funding retirement expenses as they grow older and deplete their assets, whereas recipients of lifelong-guaranteed income, other than from Social Security, are less concerned with outliving their resources.

Theoretical models of optimal consumption over the lifecycle also point at an important role for annuities. Yaari (1965) derived that complete annuitization of retirement resources is optimal, at least in a stylized setting. Later literature demonstrated that bequest motives and other factors can reduce the optimal degree of annuitization, but some annuitization almost always increases the expected lifetime utility of retirees (e.g., Hurd 1989).

Despite the apparent advantages of annuities for risk-sharing and retirement well-being, retirees have shown only limited appeal for privately-purchased annuities. Hurd and Panis (2006) found that only 7% of workers who retired from a job with a DC plan converted their plan's assets into an annuity. The shift from DB to DC plans thus implies a sharp reduction in the fraction of retirees with lifelong-guaranteed income. Some believe that this trend may benefit the heirs of retirees who die

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[1] Participants in DB plans, of course, still face the risk of losing a portion of benefits should the plan be terminated.

[2] Annuities may be categorized as immediate annuities and deferred annuities. An immediate annuity begins the periodic payments immediately after the initial premium. In contrast, a deferred annuity delays payment until some future point in time (e.g. date of retirement). Deferred annuities may be purchased with multiple payments over time. See, for example, Brown, Mitchell, Poterba, and Warshawsky (2001) for a detailed discussion of the various types of annuities. Both types may play a role in the context of DC plans.

relatively young, but it may also drive up poverty rates among retirees with the mixed fortune of living to an advanced age. From a public policy perspective, long-term implications of the shift from DB to DC plans may thus include increased old-age poverty and greater reliance on the public purse by the elderly.

In this report we attempt to shed further light on the market for annuities and the demand for annuities by DC plan participants. Our report is divided into two sections. First, we provide an overview on the market for annuities in the U.S. The centerpiece of this section is an analysis of a sample of annuity prices from 1986 to 2010. We focus on the trend in prices over time and the variation in prices across companies. The second part of the report focuses on the extent to which annuities are incorporated in DC plans, and actual recent and historical annuitization rates. Given that DC plans are frequently rolled over into IRAs, we also consider annuitization of IRA balances. The primary data for this analysis come from multiple waves of the Health and Retirement Study (HRS) and, to a more limited extent, the 2010 Deloitte 401(k) survey.

THEORETICAL BACKGROUND

As noted above, there appears to be a more limited demand for annuities than would be anticipated by economic theory. Economists, of course, have tried to explain this apparently anomalous behavior. Friedman and Warshawsky (1985 and 1990), for example, considered the pricing of annuities and bequest motives as possible drivers. In a recent paper, Brown (2008) offers a thorough review of the reasons and the corresponding literature on why individuals tend not to buy annuity products. He divides his review into arguments from rational choice models and those following behavioral or psychological explanations. In this section we briefly summarize these arguments following Brown's categorizations. The rational model explanations are:

Adverse selection. Annuity products may be perceived as expensive. This may be caused by adverse selection: People who annuitize tend to live longer than the average person in the population (Brown et al., 2001; Mitchell and McCarthy, 2002). High premiums may also be caused by fees, though it is difficult to disentangle fees from adverse selection and the rate of return the life insurance company expects to earn on invested policy premiums.

Annuitization from other sources. It may be the case that retirees already have sufficient amounts of annuitization from other sources. For example, a Social Security benefit, an important source of retirement income for many Americans, is a life annuity. Similarly, as suggested above and widely recognized in the literature, a DB plan is akin to an annuity. A person contributes into the plan during their working life in exchange for a stream of benefits their or their spouses life. Despite the declining importance of DB plans, many are still eligible for these benefits. Dushi and Webb (2004) use data from the HRS and the AHEAD to argue that high levels of pre-annuitized wealth can account for lower levels of voluntary annuitization.[3]

Risk sharing. Kotlikoff and Spivak (1981) argued that the marriage and the family can provide risk-sharing arrangements that mimic an annuity market. As Brown (2008) notes, however, for the risk sharing argument to be sufficient to explain the

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[3] It is also possible that products such as reverse mortgages can offset the need annuitize other wealth.

annuitization puzzle one would expect to see individuals annuitizing their wealth upon the death of a spouse. This does not appear to be the case.

Desire to leave bequests. Retirees may desire to maintain liquid assets to bequeath to their children. Research has suggested, however, that it is not clear how important such bequest motives are for household asset allocation and consumption decisions (Hurd 1989; Brown and Warshawsky, 2001).

Limitations of annuity markets. Despite innovations in annuity products, annuities may leave the retirees exposed to a number of risks. For example, would-be annuitants may worry about the lack of protection against inflation in current U.S. annuity products. Brown, Mitchell, and Poterba (1999), however, found that, for plausible levels of risk aversion, people attach only modest value to inflation protection. Many insurance companies now offer annuity products with benefits that increase over time—at a price (see below). Retirees may worry about unexpected large expenses, such as for medical care (Turra and Mitchell, 1984). This concern may be mitigated by annuity products that incorporate long-term care insurance (Warshawsky, Spillman, and Murtaugh, 2002). Finally, retirees may be concerned that they will outlive the insurance company. Such credit risk is mitigated by state guaranty associations which provide coverage in case of financial insolvency, typically up to $100,000 per annuity policy.[4]

In his review, Brown (2008) also considers a number of behavioral hypotheses for why individuals may not choose to purchase annuities. These explanations include, for example, biases in the manner in which annuitization options are presented to potential investors and the lack of financial literacy among typical investors.

THE MARKET FOR ANNUITIES

As defined by the American Council of Life Insurers, "[a]nnuities are financial contracts that pay a steady stream of income for either a fixed period of time or for the lifetime of the annuity owner." Annuities are typically marketed in two flavors—immediate and deferred. As the name suggests, an immediate annuity will begin making payments immediately upon the start of the contract. In contrast, a deferred annuity only makes payments after an accumulation period (e.g. when the contract owner retires). During the accumulation period, the annuity account may earn interest; upon maturity, the account is converted into an immediate annuity.[5] Both immediate and deferred annuities may be obtained as fixed or variable annuities. For example, a deferred fixed annuity typically pays a fixed interest rate during the accumulation period, whereas the interest rate on a deferred variable annuity may fluctuate depending on the performance of a market index such as the Standard & Poor's 500 (S&P 500) index. Typically, though, deferred variable

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[4] Some states offer a higher guaranty limit. The State of New York, for example, has a limit of $500,000. See www.nolhga.com for a summary of this information.

[5] Holders of a deferred annuity policy typically have the option to make withdrawals during the accumulation period and may decide to withdraw the entire account balance in a lump sum prior to the maturity date. Withdrawal or surrender charges may apply. Should the policyholder die during the accumulation phase, the account balance is typically bequeathed to his or her heirs without withdrawal or surrender charge.

annuities guarantee a rate of at least zero percent every year, so that both fixed and variable annuities types offer insurance against investment market fluctuations.[6]

Annuities may play various roles in the context of a DC plan. For example:

- Some plans offer a deferred annuity as part of their investment menu. While the employee is working, plan contributions add to the account value. When the employee retires, the balance is converted into an immediate annuity. If conversion is mandatory, this portion of the DC plan resembles a DB plan. If conversion is optional and the employee decides to take the account value in a lump sum, the deferred annuity served to shield the plan participant from investment risks but not longevity risks. Ameriks (2002) reported that increasingly many participants in a particular plan type opted for a lump sum distribution after that option was made available.
- Some plans offer the option to annuitize the plan balance upon retirement. This feature does not protect the plan participant from investment risks while working.[7] However, after retirement the annuity generally provides insurance against investment and longevity risks.
- Almost all DC plans offer the option of a lump sum distribution upon job separation. The plan participant may choose to rollover the account balance into an IRA and use the assets to purchase an immediate or deferred annuity policy. Starting at the time of the purchase, the former plan participant enjoys insurance against investment and longevity risks.[8]

Annuities can be purchased directly by individuals from insurance companies ("Individual") or through employer-sponsored retirement plans ("Group"), including DB plans. Annuity contracts can be purchased with many features that allow the contract owner to manage various types of risk. For example, fixed annuities generally offer stronger protection against investment risks than variable annuities. It is also possible to tie the annuity stream to the life of the longer-living spouse rather than to the life of an individual. Annuitants who are concerned with the loss of their assets in case they die early may opt for an annuity with a minimum-guaranteed benefit period, such as for ten years or for as long as it takes to repay the policy premium.

Overall Trends

Poterba (2001) provided a detailed history of annuities and an overview of the market. He noted that annuity products of various types have been around for centuries. Despite the fact that individuals are not purchasing annuities at levels

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[6] The terminology in the literature and industry is not always consistent. Some consider an equity-indexed deferred annuity a hybrid of a fixed and a variable annuity because of the zero percent interest rate guarantee. Others would classify equity-indexed deferred annuities as variable, not fixed, annuities. Though not explored here, one possible explanation for this inconsistency is differences in regulatory jurisdiction.

[7] There are certain types of annuities (indexed annuities) that tie the return to a particular index (e.g. S&P 500 Composite Stock Price Index) and guarantee a minimum return. See http://www.sec.gov/answers/annuity.htm for a discussion of these types of annuities.

[8] A deferred annuity may be viewed as offering partial longevity insurance, namely only after the maturity date. As noted earlier, should the policyholder die during the accumulation phase, the account balance is typically bequeathed to his or her heirs.

that might be anticipated by economic theory, annuity products have in recent decades become an important component of the U.S. insurance market. His data showed that in 1940, annuity payouts by U.S. insurance companies were only 7% of total life insurance and annuity payouts. By the 1990s annuity payouts had grown to 40%. It should be noted that throughout this period there have been regulatory changes that may have influenced the decision to purchase an annuity (e.g. U.S. Department of Labor Interpretive Bulletin 95-1).

Table 1 shows the considerations (premiums) and reserves for annuities between 2001 and 2008 and further demonstrates the size of the market for annuities today. In 2008, contributions toward Individual and Group annuities amounted to $209 billion and $119 billion, respectively. Since 2001 total considerations have grown by almost 30%. While it is somewhat masked by changes in reporting methods, Poterba (2001) noted that, relative to Group annuities, Individual annuities have grown in importance. Table 1 indicates that this trend continued through at least 2008.

Total reserves for annuities amounted to $2.2 trillion in 2008, representing an increase of over 40% since 2001. This amount includes reserves for annuities purchased by companies as part of their DB plans; we do not have information on the trend in reserves for annuities purchased with DC plan assets.

Table 1. Annuity Considerations and Reserves ($ billions)

Year	Considerations				Reserves
	Individual	Group	Other	Total	
2001	$141.7	$109.6	$22.7	$273.9	$1,585.0
2002	$168.4	$100.9	$22.6	$291.9	$1,619.1
2003	$165.9	$102.6	$21.8	$290.4	$1,900.0
2004	$172.1	$104.5	$24.4	$301.0	$2,105.9
2005	$167.0	$110.1	$25.5	$302.6	$2,258.2
2006	$187.1	$115.6	$26.3	$329.1	$2,415.2
2007	$192.5	$121.7	$27.1	$341.3	$2,548.5
2008	$209.0	$119.2	$26.8	$355.0	$2,223.4

Source: 2009 Life Insurers Fact Book

Annuity Prices

To better understand the market for annuities we sought a source of annuity prices for multiple products, companies, and years. Annuityshopper.com publishes on its web page approximately twice a year a survey of annuity prices that covers a variety of annuity products and insurance companies.[9] The website has data available in various forms from 1986 to the present. In this section, we provide an analysis of these data. Our objective is to provide insights into recent trends in annuity prices, the variation in these prices at any point in time, and how different annuity products are priced. It is very important to note that Annuityshopper.com appears to use its website and publications to market these products. This sample cannot be considered representative of all annuity prices in this category. Nonetheless, it does

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[9] While not explicitly stated, it is our understanding that the prices quoted on Annuityshopper.com apply to the individual market and may not be available to employer-sponsored annuitization programs. Also see below for a discussion on gender issues.

offer a relatively consistent series of prices for companies of varying sizes over a very long period of time and, as we will discuss below, is consistent with other data sources.[10]

To focus our analysis and remain consistent with the prior literature in this area, we first consider the payouts for a single immediate non-qualified annuity purchased by a male at age 65 for $100,000.[11] In July 2010, for example, annuityshopper.com reported quotes for this product from 19 different companies. These quotes indicate that if a 65 year man purchased this product at this time he could expect lifetime payments ranging from $570 a month to $648 a month with an average of $613 a month. If he were to pay $100,000 in 1992 the average, based on 31 price quotes, was a monthly payment of $842.

Table 2 presents basic descriptive statistics from Annuityshopper.com for the full set of price quotes for this particular product. Price quotes for qualified annuities are available from 1986 to 2001 for between 10 and 40 different companies. Over this period, the average payout for this annuity ranges from $1,009 in the first publication available to $731 in January 1999. The lowest payout observed is $542 in, surprisingly, July 1990 and the highest payout is $1,116 in February 1986. On the other hand, data for non-qualified annuities are available from 1992 to 2010. The number of firms in the non-qualified sample ranges from 12 to 41. These payouts tend to show a steady decline over the period with the average payout dropping from $842 in January 1992 to $613 in July 2010. Similarly, the lowest payout in the panel, $570, was observed in July 2010 and the highest payout, $916, was observed in January 1992.

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[10] Other price series (such as from A. M. Best) that have been utilized in earlier literature are no longer available. Data included in this overview are for illustrative purposes only.

[11] A non-qualified annuity is an annuity purchased with after-tax funds. More directly relevant for our purposes are annuities purchased with tax-sheltered DC plan assets, i.e., qualified annuities. As discussed below, prices for qualified annuities are not always available, but the prices of qualified and non-qualified annuities are close.

Table 2. Immediate Annuity Payouts per $100,000 Premiums ($ per month)

| Publication | Qualified | | | | | Non-Qualified | | | | |
date	N	Mean	Median	Min	Max	N	Mean	Median	Min	Max
Feb 1986	14	1,009	1,014	869	1,116					
Jul 1986	12	954	946	911	1,050					
Aug 1986	20	915	916	770	1,003					
Jun 1987	10	975	962	945	1,078					
Feb 1988	25	925	940	716	1,034					
Jun 1988	24	939	939	817	1,047					
Jan 1989	40	942	947	877	1,014					
Jul 1989	36	933	933	874	1,014					
Jan 1990	40	921	916	867	1,023					
Jul 1990	33	908	929	542	1,014					
Jan 1991	34	917	916	878	992					
Jul 1991	39	899	899	833	992					
Jan 1992	30	835	836	739	916	31	842	843	751	916
Jul 1992	32	835	834	709	910	33	841	834	714	910
Jan 1993	31	814	814	709	910	32	816	815	714	910
Jul 1993	36	770	764	709	879	40	779	771	714	856
Jan 1994	35	736	732	673	835	41	743	742	675	856
Jul 1994	36	767	778	654	879	39	771	778	654	839
Jan 1995	36	804	813	693	923	37	809	817	727	868
Jul 1995	34	798	794	727	872	36	793	793	727	847
Jan 1996	34	765	761	698	850	35	769	772	722	829
Jul 1996	37	773	778	711	850	40	775	780	705	830
Jan 1997	36	773	777	700	850	37	774	779	689	830
Jul 1997	28	787	794	706	847	29	786	793	706	845
Jan 1998	26	763	755	711	830	28	756	757	691	799
Jul 1998	31	733	727	638	818	34	732	740	638	799
Jan 1999	25	732	730	650	806	27	727	736	620	799
Jul 1999	21	737	742	585	809	22	735	741	585	809
Jan 2000	21	778	780	696	833	22	775	784	684	833
Jul 2000	20	795	805	696	870	21	789	804	671	857
Jan 2001	21	788	803	696	856	22	783	804	655	841
Jul 2001						19	758	768	693	802
Jan 2002						19	739	745	674	786
Jul 2002						17	746	747	693	793
Jan 2003						13	683	685	639	737
Jul 2003						13	626	623	577	667
Jan 2004						13	666	669	609	695
Jul 2004						14	677	681	643	695
Jan 2005						14	653	658	618	676
Jul 2005						16	642	639	613	692
Jan 2006						16	656	661	615	690
Jul 2006						16	681	682	658	707
Jan 2007						16	679	675	649	720
Jul 2007						15	684	691	636	715
Jan 2008						15	688	691	649	715
Jul 2008						13	705	709	681	719
Jan 2009						13	713	705	681	774
Jul 2009						12	670	676	609	706
Jan 2010						15	632	632	604	661
Jul 2010						19	613	609	570	648

Source: Authors calculations using data from Annuityshopper.com.

Prior to analyzing these data further we note it is possible to compare the Annuityshopper.com prices to the price services used by Mitchell et al. (2001). In the Mitchell et al. (2001) analysis they cite average payouts for 1995 for an annuity purchased for $100,000 by a 65-year-old male as reported in a survey provided in a July 1995 issue of *Best's Review*. The average for their sample is $794. Table 1 shows that the annuityshopper.com data has average of $798 for a qualified annuity and $793 for non-qualified annuity. Mitchell et al. (2001) also report the average for the 10 largest payouts and the average for the 10 lowest payouts in their sample. For the 10 largest they report an average of $872. This is exactly the same maximum value as for a qualified annuity in the annuityshopper.com data (a non-qualified annuity has a maximum of $842). Similarly, they report an average payout of $725 a month for the 10 lowest firms. The minimum for a qualified or non-qualified annuity in the annuityshopper.com data is $727. Finally the range of payouts between the 10 highest and the 10 lowest is 18%. This is virtually the same as the observed range between the highest and lowest payouts in the annuityshopper.com data.[12]

Table 2 suggests that there is significant variation in payouts over time and across companies in any given year. To more clearly see this variation, Figure 1 plots the payouts for each year for both qualified and non-qualified annuities. The middle line in each series depicts the mean value. The other lines show the 90th and 10th percentiles, respectively. As seen in Table 2, the values for qualified and non-qualified annuities are very similar in the period for which they are both available.

Two trends jump out immediately. First, looking across time, the payouts associated with this type of annuity have been declining over the entire panel. As noted above, qualified annuities dropped by almost 22% from 1986 to 2001. Similarly, the average payouts for non-qualified annuities dropped by more than 27% from 1992 to 2010. This downward trend is consistent with a downward trend in bond rates over the same period. For example, the yield on 10-year U.S. Treasury bonds decreased from 9.2% in early 1986 to 3.7% in early 2010.[13] Second, there appears to have been a particularly sharp drop in the payouts for non-qualified annuities starting with in January 2003. Within one year, the average payout for this type annuity dropped by $120. Finally, the variation in non-qualified annuity payouts in a given year appears to have declined. Prior to January 2003, the average range between the maximum and minimum values in one year is 20%. After that time the average range is only 11%. While we cannot rule out the possibility that these trends are due to the composition of the sample selected by annuityshopper.com, it does suggest some systematic changes in the payouts associated with this product.

As with any traded good, the price of an annuity is ultimately determined by the supply and demand of the good. The literature has noted a number of factors that could influence the price of an annuity.[14] These include the rate of return that companies receive on their investments, the overhead costs associated with the

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[12] While for many years annuityshopper.com includes quotes for both qualified and non-qualified it should be noted that the two values are quite similar. In the years for which both are available in the data, the average payout for qualified is always within $9 of the average payout for a non-qualified annuity.

[13] http://www.federalreserve.gov/datadownload/Output.aspx?rel=H15&series= 0809abf197c17f1ff0b2180fe7015cc3&lastObs=&from=&to=&filetype=csv&label= include&layout=seriescolumn.

[14] The discussion in this paragraph is based on Congressional Budget Office (1998).

marketing and operations of the insurance companies, the expected mortality rates of the annuitants, and the overall market structure of the industry. Many of these factors are undoubtedly changing over the time period of our sample and could account for the pattern that we observe. For example, the general downward trend in payouts is consistent with a decline in mortality rates over time. As individuals live longer, an annuity with a $100,000 premium purchased at age 65 would have to provide payments over a longer period of time. All else equal, this would imply lower monthly payouts. Warshawski (2001) and Mitchell et al. (2001) attempted to distinguish some of these factors.
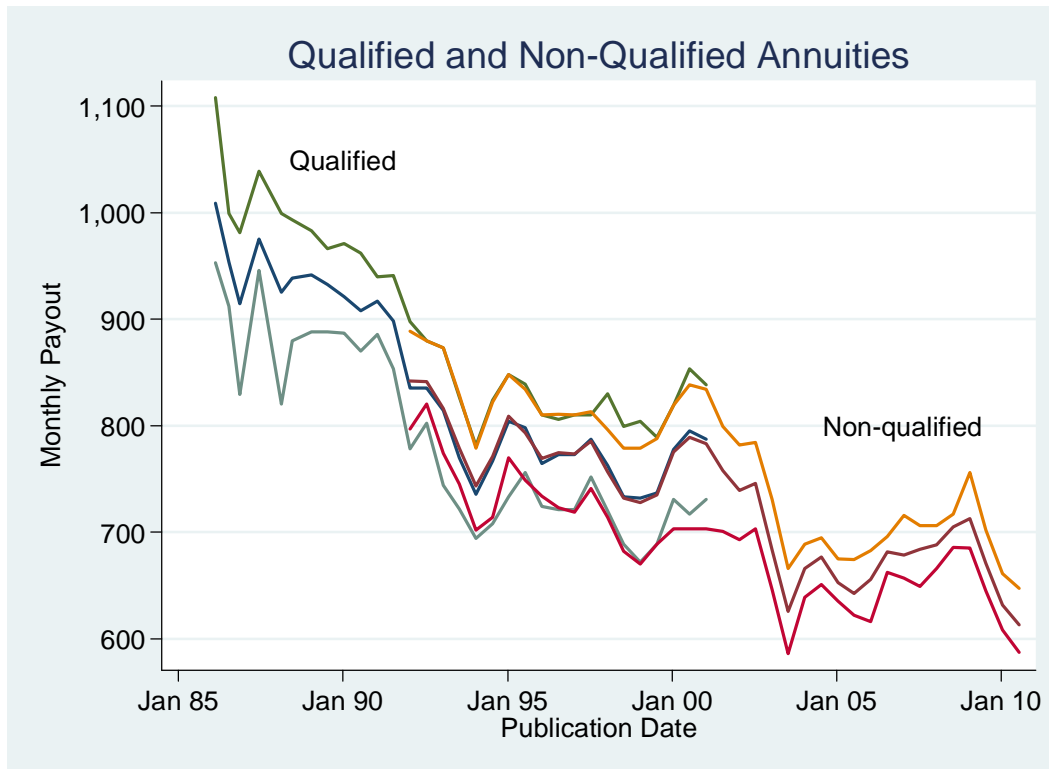
Figure 1. Monthly Annuity Payouts (10th percentile, mean, and 90th percentile of monthly payouts for a $100,000 premium)

One of the risks associated with annuities is that the annuitant may outlive the insurance company.[15] It seems reasonable that would-be annuitants are willing to accept a lower monthly payout from a company that is perceived to be less likely to fail. One way to gauge that risk is to examine the bond ratings for insurance company and the payout of an annuity purchased from that company. The data from annuityshopper.com also contain various bond ratings for most companies in their sample. Figure 2 shows the relationship between the July 2010 payouts for same type of annuity discussed above and the S & P bond rating. Consistent with our expectation, there appears to a negative correlation between the payout and the bond rating. Indeed, the lowest payout comes from the company with the highest rating and the highest payout comes from the company with the lowest rating.

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[15] As discussed above, this credit risk is mitigated by state guaranty associations which provide coverage in case of financial insolvency, typically up to $100,000 per annuity policy.
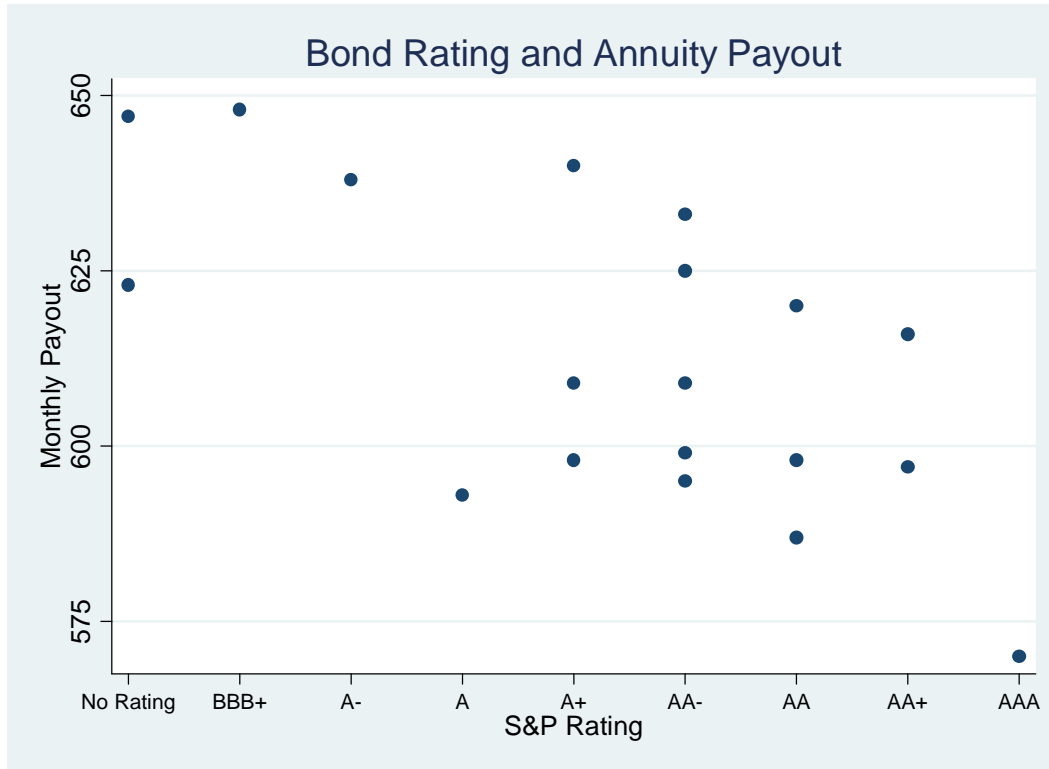
Figure 2. S&P Bond Rating and Monthly Payouts

The annuityshopper.com data also contain the prices associated with other annuity products. For example, it is, of course, possible to purchase an annuity at ages other than age 65. Table 3 shows the average payout for quotes published in July 2010 for single life annuities purchased by a man or a women at varying ages. Clearly, the longer expected life expectancy implies lower payouts. For example, if a 50-year-old man were to purchase an annuity for $100,000 he could expect a payout of $471 per month. In contrast, the average payout for a 90-year-old man for the same annuity is $1,540. Table 3 also shows the gender differences in annuity payouts. For instance, the average payout for an annuity purchased by a 50-year-old woman is $450, $21 lower than the average payout for a man of the same age.[16]

Table 3. Average Annuity Payouts per $100,000 Consideration by Age and Gender ($ per month)

Age	50	55	60	65	70	75	80	85	90
Male	471	505	550	612	697	817	986	1,225	1,540
Female	450	479	517	569	639	745	900	1,137	1,439

Source: Annuityshopper.com, July 2010

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[16] The average annuity payout for a 65-year-old male as shown in Table 3 is $612. In contrast, Table 2 showed $613. The numbers in Table 3 were taken directly from summary tables presented on Annuityshopper.com. The summary statistics in Table 2 were calculated by the authors from company-specific data also presented on Annuityshopper.com.

As we noted above, it is our understanding that the prices quoted on Annuityshopper.com are for the individual market. As shown in Table 3, the payouts to men and women can be different for the same premium contribution because of differences in life expectancy. In an employer-sponsored retirement plan, however, gender neutrality in the payouts is required under law. Stemming from the Supreme Court case Arizona v. Norris,[17] it was considered discriminatory if men and women received different payouts for equal contributions. Specifically, the case noted that retirement benefits stemming from contributions should be calculated in a gender neutral manner. The EEOC Compliance Manual reflects this rule:

> *Although women as a class generally live longer than men, Title VII requires that each woman -- and each man -- be treated as an individual. As a result, employers may not use sex-based actuarial tables -- which rely on generalizations about womens' and mens' life expectancies -- to calculate either the amounts that the employer will pay in benefits to men and women or the amounts that it will charge its male and female employees for those benefits. Where an employer has used sex-based actuarial tables, the investigator should find cause.*[18]

It is also possible to purchase an annuity that is based on the joint survivorship of a couple. Table 4 presents the payouts associated with two of these annuities. The first is one in which 100% of the payment is available to the surviving partner. If a 65-year-old male and a 60-year-old female purchased a $100,000 annuity, the average monthly payout was $480, approximately 22% less than the average monthly payout for a 65-year-old male without survivor benefits. As with the single life annuity, the amount of the payout increases with the age of the annuitants. It is also possible to purchase an annuity in which 50% will go to the surviving partner. This would yield on average a higher monthly payout. Again for the 65-year-old male and the 60-year-old female the average monthly payout is $559 per month.

Table 4. Average Annuity Payouts per $100,000 Consideration by Survivor Status and Age ($ per month)

Male age	Female age	100% Survivor	50% Survivor
65	60	480	559
70	65	524	627
75	70	580	717
80	75	668	851

Source: Annuityshopper.com, July 2010

Finally, it is also possible to purchase annuities that are not tied to someone's life but rather to a fixed point in time. In this type of annuity, if the annuitant died the payments would continue to a designated beneficiary. Table 5 shows the average monthly payouts for a several period certain annuities. Not surprisingly, the monthly payout declines with the length of the period.

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[17] Arizona Governing Committee for Tax Deferred Annuity and Deferred Compensation Plans v. Norris, 463 U.S. 103 S.Ct. 3492, 77 L.Ed.2d 1236, (1983).
[18] U.S. Equal Employment Opportunity Commission (2010).

Table 5. Average Annuity Payouts per $100,000 Consideration for Period Certain Annuities ($ per month)

Period (years)	Monthly payout
5	1,693
10	928
15	689
20	576
25	505
30	491

Source: AnnuityShopper.com, July 2010

AVAILABILITY OF ANNUITIES IN DC PLANS

As discussed above, annuities may play a role in DC plans through at least three avenues: (1) plans may offer a deferred annuity among their investment options, (2) plans may offer the option to annuitize the account balance (invested in any type of security) upon retirement, and (3) DC plan participants may roll over their account balance into an IRA and subsequently purchase an annuity. Almost all DC plan participants have access to annuities via the third avenue. This section attempts to document how widespread the other two avenues are.

Our findings are based on the 2009 Deloitte 401(k) survey and the National Compensation Survey (NCS).

The Deloitte 401(k) survey is an annual survey of employers that sponsor a 401(k) plan. Over 600 employers responded to the 2009 survey. Just 1% of plan sponsors offered an in-plan deferred annuity as an investment option to its participants.

The NCS conducts an annual survey of companies and other private sector establishments in the United States, carried out by the Bureau of Labor Statistics. It aims to document wages, benefits, and employee costs. Among others, the survey collects information on the features of 401(k) or other DC plans that surveyed establishments may offer, including the option to annuitize one's plan balance upon retirement.

Based on an analysis of the 2000 NCS, Blostin (2003) found that among workers in the surveyed establishments who were covered by a DC plan, 33% were given the option to annuitize their plan balance upon retirement. The rate was 34% for participants in savings and thrift plans. According to BLS tabulations of the 2009 NCS, the prevalence of an annuity option in savings and thrift plans had fallen to 15% of participants by 2009 (BLS 2010).[19]

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[19] While the NCS collected similar information in intervening years, the response rate of the question on the annuitization option was too low to warrant publication of the option's prevalence (personal communication with Anthony Barkume, Senior Research Economist and Chief of the Compensation Research and Program Development Group at the U.S. Bureau of Labor Statistics).

ANNUITIZATION RATES OF DC PLANS AND IRAS

When a worker who is covered by a DC plan separates from his job, he typically has several options of what to do with his DC plan assets, including leaving the assets in his former employer's plan, taking a cash distribution, rolling the balance over into an Individual Retirement Account (IRA), or converting the balance into an annuity. This section reports on the rates at which recent retirees annuitize their DC plan balances.

Our analysis is based on the HRS, a biennial survey of Americans aged 51 or older, and their spouses. The HRS started in 1992 with respondents aged 51-61 years old (and their spouses). Insofar possible, the respondents were re-interviewed every two years. Also, the sample was gradually expanded to eventually cover all ages 51 and older.

If a respondent left the job he (or she) held in the previous wave, he was asked what he did with the pension rights, if any, accrued in the prior job—cashed out, rolled over into an IRA, left to accumulate, or converted into an (immediate or deferred) annuity. We restricted the sample to respondents who indicated that they were retired at the time of the survey and tabulated pension disposition responses. The unit of observation is a DC plan; some respondents had multiple plans on their former job, and disposition questions were asked about each of those plans.
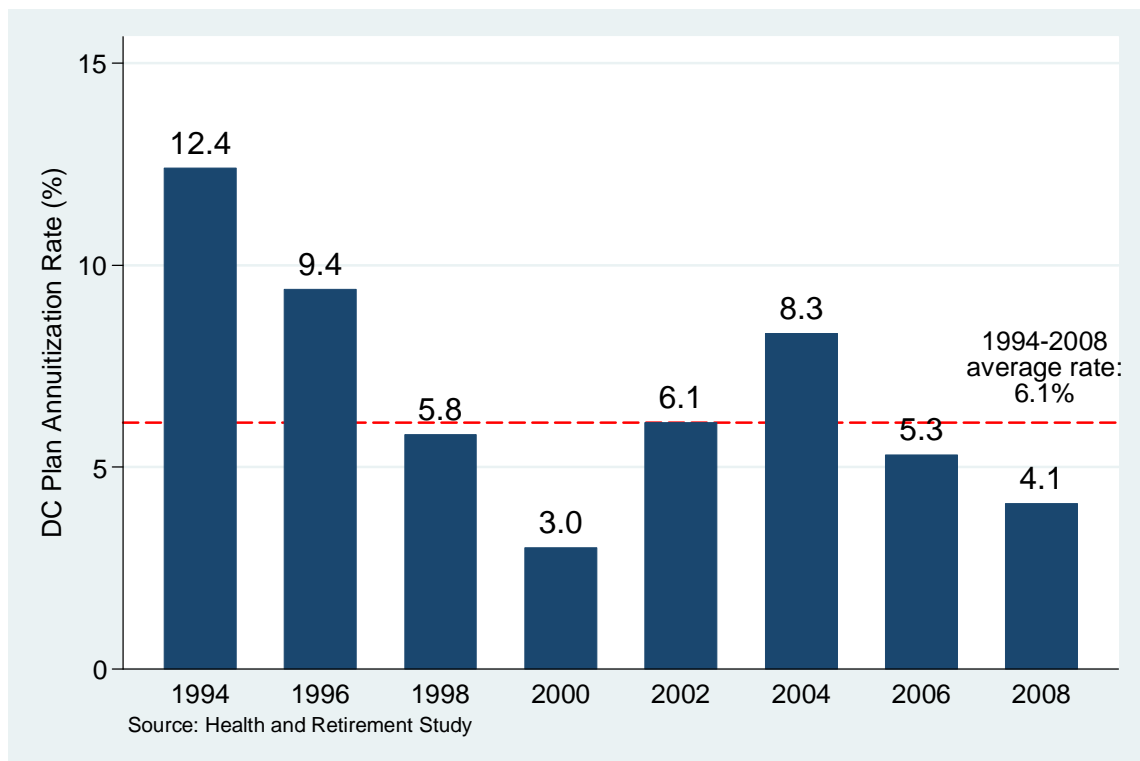

Figure 3. DC Plan Annuitization Rates

Figure 3 shows the fraction of DC plans that were reportedly converted into an annuity. The rates, weighted by respondent sampling weights, fluctuated from wave to wave, without a clear trend. Some of the rates' variability may have been due to the changing age composition of the sample and some of it may have been due to

sampling error.[20] The 1994-2008 weighted average annuitization rate for the DC plans held by HRS respondents at the time of their retirement was 6.1% and only the 2000 rate was statistically significantly different from the 1994-2008 average.

Figure 3 tells only part of the story. It shows the direct conversion rates from DC plans into annuities between the retirement date and the HRS interview date. It does not show conversions after the HRS interview or indirect conversions, that is, rollovers into an IRA followed by an annuitization. Since survey waves are approximately two years apart, the average duration between job separation and interview was about one year. Retirees may leave the DC plan assets in their former employer's plan and annuitize it at some time after the subsequent HRS interview. The HRS does not collect information about such annuity purchases. However, it does ask about annuitizations of IRAs.

The annuitizations of DC plans discussed above and as reported in the 1994-2008 HRS amounted to about $56 billion. Similarly, the annuitizations of IRAs as reported in the 1994-2008 HRS amounted to about $214 billion, i.e., about four times as much as DC plan annuitizations. The two figures are not strictly comparable, in part because of the age structure of the HRS and the time lag between retirement and IRA annuitization. For example, respondents to the 1994 survey were 53-63 years old; annuitizations of IRAs *held* by 53-63 year-olds may not be representative of annuitizations of IRAs *created* by 53-63 year-old retiring workers. Also, not all IRA assets started life in a DC plan, though the large majority did.[21] Finally, the mix of immediate and deferred annuities differs, with deferred annuities much more prevalent among IRA conversions than among DC plan conversions. There are, however, some potential reasons why respondents may choose to rollover their DC assets to an IRA prior to annuitization. For example, the respondent's DC plan may not offer direct annuitization or may impose restrictions that are unpalatable to the respondent on the amount of assets that can be annuitized (e.g., all-or-nothing). Also, some respondents may want to delay the annuitization decision, perhaps hoping to resolve uncertainty about health or living arrangement decisions.

In sum, approximately 6.1% of DC plans owned by newly retiring workers were annuitized within about one year. The magnitude of annuitizations of IRAs suggests that the fraction of plans that are eventually annuitized is well above 6.1%, though data limitations prevent an accurate estimate. Also, IRAs tend to be converted more often into deferred annuities than into immediate annuities. Both types offer protection against investment risks, but the protection by immediate annuities against longevity risks is stronger than that by deferred annuities.

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[20] In 1994, when respondents were 53-63 years old, only 78 respondents had retired from a job with a DC plan and provided a valid disposition response. The 95% margin of error around the reported 12.4% annuitization rate is +/- 7.3 percentage points. The sample sizes in other waves were at least 193, with an average of 262, and the margins of error correspondingly smaller—between 2.0 and 4.1 percentage points.

[21] In the decade from 1998 to 2007, 95% of inflows into traditional IRAs originated from rollovers of DC plans (Investment Company Institute, 2010).

SUMMARY AND CONCLUSION

Both before and after retirement, DC plan participants are exposed to investment risks. After retirement, they further risk outliving their retirement resources. A potential mechanism to mitigate those investment and longevity risks is through the purchase of annuities. Immediate annuities offer protection against both investment and longevity risks, while deferred annuities protect against investment risks and only partially against longevity risks. This report describes the role of annuities in providing retirement income and security to workers and retirees with a DC plan.

Annuities may play various roles in the context of a DC plan: Some plans offer a deferred annuity as part of their investment menu, some offer the option to annuitize the plan balance upon retirement, and almost all DC plans offer the option of a lump sum distribution upon job separation, which may be rolled over into an IRA and used to purchase an annuity.

We found that only about 1% of DC plans offer a deferred annuity product among their investment options. About 6.1% of workers who retire with a DC plan convert their account balance into an annuity. Substantial additional annuitization takes place sometime after retirement through conversions of IRAs, often in the form of a deferred annuity.

Our analysis of annuity prices indicated that the monthly benefit from an immediate fixed annuity available at a certain premium amount have generally declined over the past two decades. Put differently, annuity prices (premiums) have generally risen. We also found that the price range of various insurance companies' offerings has narrowed over time. Generally speaking, insurance companies with good credit ratings command higher prices than those with lower credit ratings. Premiums also vary by age and gender of the would-be annuitant and for annuities with features such as survivor benefits or a minimum-guaranteed benefit period.

REFERENCES

2009 Deloitte 401(k) survey. Deloitte, International Foundation, and International Society (2006). Annual 401(k) Benchmarking Survey, 2009 Edition. Deloitte Consulting LLP, the International Foundation, and the International Society of Certified Employee Benefit Specialists. http://www.deloitte.com/assets/Dcom-UnitedStates/Local Assets/ Documents/us_consulting_401(k)AnnualBenchmarkingSurvey2009_081409.pdf.

Ameriks, John (2002). "Recent Trends in the Selection of Retirement Income Streams Among TIAA-CREF Participants." *TIAA-CREF Research Dialogue*, Number 74, December 2002. http://www.tiaa-crefinstitute.org/articles/74.html.

American Council of Life Insurers (2009). *Life Insurers Fact Book 2009*. Washington DC.

Bureau of Labor Statistics (2010). "Savings and thrift plans: Method of distribution of retirement benefits, private industry workers, National Compensation Survey, 2009." http://www.bls.gov/ncs/ebs/detailedprovisions/2009/ownership/private/ table65a.pdf.

Brown, Jeffrey R. (2008). "Understanding the Role of Annuities in Retirement Planning." Chapter 6 in Overcoming the Saving Slump: How to Increase the Effectiveness of Financial Education and Saving Programs, Annamaria Lusardi (ed.). Chicago: University of Chicago Press.

Brown, Jeffrey R. and Mark J. Warshawsky (2001). "Longevity-Insured Retirement Distributions from Pension Plans: Market and Regulatory Issues." National Bureau of Economic Research Working Paper 8064. Cambridge, MA.

Brown, Jeffrey R., Olivia S. Mitchell, James M. Poterba, and Mark J. Warshawsky (2001). *The Role of Annuity Markets in Financing Retirement*. MIT Press.

Brown, Jeffrey R., Olivia S. Mitchell, and James M. Poterba (1999). "The Role of Real Annuities and Indexed Bonds in an Individual Accounts Retirement Program." National Bureau of Economic Research Working Paper No. 7005. Cambridge, MA.

Friedman, Benjamin and Mark J. Warshawsky (1985). "Annuity Prices and Saving Behavior in the United States." National Bureau of Economic Research Working Paper No. 1683. Cambridge, MA.

Friedman, Benjamin and Mark J. Warshawsky (1990). "The Cost of Annuities: Implications for Saving Behavior and Bequests." *The Quarterly Journal of Economics*, Vol. 105, No. 1, pp. 135-154.

Health and Retirement Survey (HRS), various years. The Regents of the University of Michigan. http://hrsonline.isr.umich.edu.

Hurd, Michael D. (1989). "Mortality Risk and Bequests," *Econometrica* 57(4): 779-813 Hurd, Michael and Constantijn Panis (2006). "An Analysis of the Choice to Cash Out, Maintain, or Annuitize Pension Rights upon Job Change or Retirement." *Journal of Public Economics* 90(12): 2213-2217.

Investment Company Institute (2010). "The U.S. Retirement Market, 2009." *Research Fundamentals* 19(3), May 2010. http://www.ici.org/pdf/fm-v19n3.pdf.

Kotlikoff, Laurence J. and Avia Spivak (1981). "The Family as an Incomplete Annuities Market." *Journal of Political Economy*, vol. 89, no. 2, pp. 372-391.

Mitchell Olivia S., James M. Poterba, Mark J. Warshawsky, and Jeffrey R. Brown (2001). "New Evidence on the Money's Worth of Individual Annuities." Chapter

5 in *The Role of Annuity Markets in Financing Retirement*, Jeffrey R. Brown, Olivia S. Mitchell, James M. Poterba, and Mark J. Warshawsky (eds.), MIT Press.

Mitchell, Olivia S. and David McCarthy. 2002. "Annuities for an Ageing World." National Bureau of Economic Research Working Paper No. 9092. Cambridge, MA.

Panis, Constantijn (2004). "Annuities and Retirement Well-being." Chapter 14 in *Pension Design and Structure: New Lessons from Behavioral Finance*, Olivia S. Mitchell and Stephen P. Utkus (eds). Oxford: Oxford University Press.

Poterba, James M. (2001). "A Brief History of Annuity Markets." Chapter 5 in *The Role of Annuity Markets in Financing Retirement*, Jeffrey R. Brown, Olivia S. Mitchell, James M. Poterba, and Mark J. Warshawsky (eds.), MIT Press.

Turra, Cassio M. and Olivia S. Mitchell. 2004. "The Impact of Health Status and Out-of-Pocket Medical Expenditures on Annuity Valuation." University of Michigan Retirement Research Center WP 2004-086. Ann Arbor, MI.

U.S. Equal Employment Opportunity Commission, (2010). http://www.eeoc.gov/policy/docs/benefits.html#A.%20Retirement%20Benefits%20(T7).

Warshawsky, Mark J., Brenda Spillman, and Chris Murtaugh. 2002. "Integrating Life Annuities and Long-Term Care Insurance: Theory, Evidence, Practice, and Policy." In *Innovations in Financing Retirement*, Zvi Bodie, Brett Hammond, and Olivia Mitchell (eds.). Philadelphia, PA: University of Pennsylvania Press: 198–221.

Yaari, M. (1965). "Uncertain Lifetime, Life Insurance, and the Theory of the Consumer." *Review of Economic Studies* 32: 137-150.

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