

VARIABLE ANNUITIES: A NEW CONCEPT FOR MEETING INFLATION *)

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Variable annuities are becoming the most vigorously discussed new development in pension circles. This paper will explore the need for them, their actual use for over three years in the college world, in the United States and Canada, their extension into the business world, some of the questions raised with respect to them, and some of their broader economic and social implications.

Why is there a need for variable annuities?

Retired people need *purchasing power*, what the economist calls „real income“, in order to buy the necessities and niceties of life toward which they saved during their working years. Traditional pension plans, however, are designed to provide a certain number of dollars of retirement income without respect to their purchasing power. The person who retired in 1940 on a fixed-dollar income is now faced with living on only half his original amount of purchasing power.

Not once during American history has the price level remained stable during the average 50 to 60 years of a single individual's working and retired lifetime. This is despite the fact that the American dollar has been one of the stablest of all currencies. Taking the 1947—1949 dollar as equal to 100 cents, the dollar is now worth 87 cents; it was worth \$ 2.94 in 1900 and \$ 4.35, or precisely five times its present value, in 1850. If we look ahead, the existence of built-in inflationary biases in our economy, plus our world commitments, would seem to make it prudent for us to assume that inflation can happen again and that we should help our retired people be prepared for it.

What are variable annuities?

A *life annuity* is a series of payments lasting throughout one or two people's remaining lifetime. Many legal and actuarial refinements can be quoted. Essentially, however, an annuity is an enormously useful device through which an individual, by sharing risks with many other individuals, can use up both the earnings and the principal of his savings without any danger of outliving his income. Annuities can be expressed in dollars, guilders, francs, pounds, rubles, marks, or units. Traditional annuities in the United States have been expressed in terms of dollars, with small dollar-amount variations from year to year because of dividend payments, and very large variations from time to time in terms of purchasing power.

Variable annuities are a new type of annuity expressed in units, the dollar value of which varies from time to time directly in response to changes in the capital values and earnings on the investments supporting them. The variable annuity directly applies the annuity principle to a new area of investment, common stocks, giving the individual the assurance that he can maximize his retirement income by using up both capital and dividend payments without danger of outliving his income. The dollar amount of an in-

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dividual's income from a variable annuity will be larger when earnings and prices of equity investments are higher, and vice versa.

What is the Teachers Insurance and Annuity Association (TIAA)?

In 1905 Andrew Carnegie electrified the college world by announcing a grant of \$ 10,000,000, later increased to \$ 15,000,000, to provide free pensions to college teachers in a limited number of institutions. Although this grant was generous, it was apparent by 1916 that the list for free pensions would have to be closed and that some new instrument for the carrying forward of Carnegie's ideas would have to be developed. The Teachers Insurance and Annuity Association of America was established in 1918 and endowed by the Carnegie Corporation of New York and the Carnegie Foundation for the Advancement of Teaching. The purpose of the new non-profit corporation was to fund the retirement and insurance plans for colleges, universities, and other such educational institutions in the United States and Canada. In the ensuing 37 years, 675 colleges and other educational institutions have established TIAA retirement and insurance plans, and the company's assets now equal \$ 450,000,000.

The TIAA retirement plans in effect at non-profit educational institutions are specially designed to meet the needs of teachers and scholars. They are almost always contributory, with the college and the individual usually sharing equally premiums amounting to 10 per cent or, in the more generous plans, 15 per cent of salary. Employer contributions vest *immediately* in the individual, so that he can transfer his total retirement savings from college to college whenever he wishes. TIAA issues traditional fixed-dollar annuities based upon investments largely in bonds, mortgages, and other evidences of indebtedness.

The enrollment rush in the colleges following the second World War found TIAA growing with great rapidity and soundness, but one worry kept haunting us. We were paying out to those college staff members already retired every dollar we had ever guaranteed as annuities. The purchasing power of those dollars, however, had declined by almost one-half since 1940, and the retired professors were having a hard time making ends meet. The traditional type of pension plan simply was not solving the problem. This raised questions as to whether the traditional approach, labeled *conservative*, was not actually *speculative* from the individual's standpoint. We went to work to try to devise a system to take as much risk out of the individual's retirement income as possible — to try to supply a more stable income in terms of purchasing power. This was the reason for the establishment of CREF.

What is the College Retirement Equities Fund (CREF)?

The College Retirement Equities Fund is a new type of retirement system issuing variable annuities based on the performance of a carefully selected and diversified list of common stocks. It is a non-profit corporation established by a special act of the New York State Legislature. It started operations on July 1, 1952. CREF is a companion organization to TIAA, and both are under the supervision of the New York State Insurance Department.

If the college has approved participation in CREF, each of its staff members may elect that one-fourth, one-third, or one-half of his total annuity premium be invested in CREF. This means that up to one-half of

each participant's total annuity premium can be invested in the new Equities Fund to produce a variable annuity based on common stock performance, with the remainder being invested in a traditional fixed dollar annuity through TIAA. So far, 9 out of 10 participants elect to have one-half their money in the new Equities Fund.

How does this new device work?

Each premium paid by the college and its staff member is divided between TIAA and CREF in the proper proportion. The part going to CREF, usually one-half of the total, purchases *accumulation units* for the individual. Month by month, the participant buys units in the new Equities Fund with his level dollar premiums related to salary. A \$ 50 premium will buy five accumulation units when the unit value is \$ 10, or four units when the unit value is \$ 12.50. At the end of each year, dividend income is credited to each participant on a pro rata basis in the form of additional accumulation units. Thus the individual has a constantly growing share in a common stock fund.

At time of retirement the individual trades in his *accumulation units* for *annuity units*. CREF guarantees the individual that it will pay him the current value of a specified number of annuity units each month as long as he lives. The value of these units is recomputed once each year, taking into account changes in the prices and dividend payments of the common stocks owned by CREF. The value of one annuity unit might be \$ 10 one year, \$ 9 the next, \$ 11 the third, and so forth. Thus a person who owned 10 annuity units would receive \$ 100 a month the first year, \$ 90 the second, and \$ 110 the third.

How would variable annuities have worked during the past?

Before establishing CREF, we conducted an exhaustive economic study covering the years 1880—1951 (now extended to 1955). The results are available in a booklet entitled *A New Approach to Retirement Income*.¹⁾ We studied the theoretical operation of a variable annuity plan during war and peace, prosperity and depression, inflation and deflation—all phases of the economic cycle. This survey showed a very strong tendency for the variable annuity to adjust to changing economic situations. It would not have been a panacea; it would not have hedged against the World War I inflation until the mid-twenties, but, of course, the fixed-dollar annuity never did catch up. Exhibit 1 gives one example from that economic study. It was chosen because it covers two World Wars and the greatest depression in history.

The 1900—1950 Period. Many of the people who retired around 1930 are still living. Most of them started their working career close to the turn of the century. Exhibit 1 shows the typical situation of the person who saved during 1900—1930 toward a fixed-dollar annuity, from which he has subsequently been receiving a level income. Also on the chart is the experience he might have enjoyed had variable annuities been available since the turn of the century.

Fixed Dollar Annuity. At the left-hand side of the chart are three cross-

¹⁾ *A New Approach to Retirement Income*, by William C. Greenough, TIAA-CREF, 522 Fifth Avenue, New York 36, N.Y. 50 cents. The accompanying charts are taken from this book. See also *An Experiment with the Variable Annuity*, by George E. Johnson, and *A Retirement System Granting Unit Annuities and Investing in Equities*, by Robert M. Duncan, both TIAA-CREF.

hatched columns marked „Fixed Dollar Fund”. Participant A contributed \$ 100 a year toward a fixed-dollar annuity of the type regularly issued by TIAA and other retirement systems. His \$ 3,000 in premiums (\$ 100 a year times 30 years) accumulated at compound interest would have grown to \$ 6,500 by the time of his retirement in 1930. The interest rate used is the rate actually earned by life insurance companies. With the \$ 6,500 accumulation, Participant A could have purchased a fixed-dollar annuity of about \$ 552 a year; this is shown by the straight line marked „Fixed Dollar Annuity” extending from 1930—1951 on the right-hand side of the chart.

Combined Annuity. Participant B meanwhile contributed half of his premium (\$ 50 a year) to the same type of fixed-dollar annuity as Participant A and half to a variable annuity. The premium for the latter was assumed to have been invested in over 400 common stocks by using the Cowles Commission and Standard and Poor’s Indexes. This combined fund grew at about the same rate as the fixed-dollar fund from 1900—1920, as shown in the appropriate columns on the chart. It then increased rapidly during the speculative common stock period of the late 1920’s and had a value of almost \$ 10,500 in 1930.

After retirement in 1930, Participant B received a fixed-dollar annuity purchased by half his total premiums plus a variable annuity resulting from his accumulated share in the equities fund. The variable annuity, as already explained, takes into account not only the probable life span as indicated in mortality tables, but also reflects yields, realized capital gains and losses, and changes in market prices of common stocks.

In 1930 Participant B would have received \$ 907 from his combined annuity compared with the \$ 552 for Participant A. At the bottom of the depression in 1932, the combined annuity would have dropped to \$ 503, from which it would have risen to \$ 1,168 in 1951.

Purchasing Power. The dotted line, called the „Adjusted Cost of Living”, charts the number of dollars that should have been received by the retired person during each year of his retirement in order to give him a level „purchasing power” or „real” income. It is easy to see that the combined annuity is not a panacea, it by no means adjusts perfectly to changes in the cost of living. However, the purchasing power of the fixed-dollar annuity automatically and by definition moves in the opposite direction to the cost-of-living changes. In 1951 Participant A’s annuity was still \$ 552, whereas it should have been \$ 1,125 to give him the proper purchasing power. Participant B’s annuity in that year was \$ 1,168. Thus the fixed-dollar annuity was worth only half of what it should have been; the combined annuity on the other hand had hedged excellently against the World War II inflation.

The 1910—1955 Period. If Participant A had paid \$ 100 a year into the fixed-dollar fund and Participant B a similar amount into the combined fund from 1910—1940, how would they then have fared during retirement?

As shown by Exhibit 2, Participant A would have received a level income of \$ 505, which was satisfactory in 1940 but gave him only 60 per cent of the purchasing power he should have had in 1950.

Participant B would have started out with an annuity of \$ 577 and would have received \$ 856 in 1950, giving him 102 per cent of the purchasing power he needed during the latter year. During the last five years the purchasing power of the fixed dollar annuity has dropped to 54 per cent, while, because of the recent substantial rise in common stock prices, the combined

annuity would now be worth 130 per cent in purchasing power (\$ 1,220) for the person who retired in 1940.

What has CREF's actual experience been?

In the 40 months since CREF was established, it has grown to \$ 25,000,000 in assets, with well over 500 colleges permitting their staff members to participate and with a rapidly growing group of individual participants, now over 23,000.

During the first year and a half the stock market went through a series of gentle undulations but then started a rapid rise. Accumulation units, representing the share owned by persons currently paying premiums, were worth around \$ 10 for the first year and a half, and have now risen in value to around \$ 17.

An interesting comparison is to see what would actually have happened to an individual who paid a single premium for a \$ 50-a-month annuity in TIAA and an equivalent annuity in CREF when it started operations in July, 1952. The individual's actual dollar income for the ensuing periods would have been as follows:

<i>Annuity Year</i>	<i>TIAA Income</i>	<i>CREF Income</i>	<i>Total Annuity Income</i>
1952—1953	\$ 50	\$ 50,00	\$ 100,00
1953—1954	50	47,30	97,30
1954—1955	50	53,70	103,70
1955—1956	50	70,55	120,55

What have been the average yields and capital growth of common stocks?

During the first half of this century common stocks in the United States showed an average annual yield of 4.9 per cent and an average annual capital growth of 2.3 per cent, for a total annual growth of 7.2 per cent. In some years and periods, the gain was much larger; in others there was substantial capital loss.

During the past 20 years the performance was, of course, even more startling. The average annual yield on common stocks was 5 per cent; capital gains, 5.5 per cent, for a total growth of 10.5 per cent per year. Meanwhile the cost of living rose from 58.7 in 1935 to 114.8 in 1954, having increased in every year except for fractional declines in 1938, 1939, and 1949. A variable annuity based on average common stock performance, coupled with a traditional fixed dollar annuity for added protection during deflation, would have given our retired people remarkably secure protection during all phases of economic activity.

Are there other variable annuity plans now in operation?

The first industrial equity annuity plan, that of the Long Island Lighting Company, was announced on October 10, 1952, and several others are now operating. In addition to those mentioned below, there are plans for pilots of Pan American, Panagra, and Northeast Airlines, plans for employees of Boeing Aircraft, and a current proxy statement for Bristol-Myers. I shall give a brief description of the major types without refining the details ²⁾.

²⁾ For a more detailed discussion, see „Pensions—Meeting Price Level Changes”, by William C. Greenough, in *Pensions: Problems and Trends*. Dan M. McGill, Editor, Wharton School of Finance and Commerce, University of Pennsylvania.

1. *Bank trustee equity annuity as supplement to traditional insured group annuity* (Long Island Lighting Company, Mineola, New York; Chemstrand Corporation, Decatur, Alabama; Post and Lester Company, Hartford, Connecticut).

Each of these plans follows the same general philosophy as TIAA-CREF. They take the same realistic and conservative approach of balancing retirement income between a guaranteed fixed-dollar annuity and a variable annuity, both as supplement to Social Security.

A major difference is in the method of computing contributions. Almost all TIAA-CREF plans are money-purchase arrangements, which spread contributions out more evenly during working years and avoid heaping up the purchases of common stocks during the years shortly before retirement.

For the above three plans, employer contributions are computed in a standard pension-trust manner by making certain assumptions as to interest and mortality. These assumptions are usually that interest will be earned at the rate of 3 or $3\frac{1}{2}$ per cent a year, that there will be no capital gains or losses, and that mortality will follow the chosen annuity mortality table. Thus contributions for each participant increase as age increases. The resulting premiums purchase "benefit units". Funds are „invested in diversified common stocks and other securities". The value of the „benefit units" and, hence, of the retired person's income varies from year to year according to the value of the trust fund, and, therefore, primarily in accordance with the performance of the common stocks and any other securities held.

The three equity annuity plans for which I have current operating figures—Long Island Lighting Company, Post and Lester, and Kidder, Peabody—have had experience comparable to that of CREF. The values of their „benefit units" also have gone up rapidly in the past two years.

2. *Fixed dollar annuity and equity annuity plans, both trustee* (Kidder, Peabody and Company).

This plan supplanted an existing deferred profit-sharing plan. It covers salaried and commissioned employees. The only significant difference between it and the plans mentioned above is that the fixed-dollar portion is trustee instead of insured.

3. *Profit-sharing plan allocating credits in the form of benefit units* (Smith, Barney and Company).

Under this plan contributions are based on a profit-sharing formula modified to help solve the retirement-income problem for those now closer to retirement. As with the other equity plans, benefits are allocated in the form of benefit units.

4. *Plan with direct cost of living adjustment* (National Airlines).

In July, 1954, a trustee plan was announced for National Airlines. Under this plan, the benefits paid to retired employees are adjusted each six months to a 24-month moving average of the consumers price index. There are certain limitations on rapid increases and decreases in the benefits. While the trust instrument says little about investment policy, it is contemplated that approximately half of the fund will be invested in equities.

This is not a true equity or variable annuity plan, but is included here because of its different approach to solving the same problems. The idea in the National Airlines plan is to adjust the benefits more directly to cost-of-living changes rather than to the current performance of the investments

in the portfolio. This places much greater responsibility on the employer than in the case of equity annuity plans, and it is thus appropriate only for those employers in a position to shoulder the extra risks. Whether it will prove to be better or worse for employers and their employees in the long run is anybody's guess.

The correlation between the cost of living and common stock prices is not so close that benefits can be forced into a strait-jacket without taking chances that the fund itself might become insufficient. Controls placed on the upward movements of the pensions help protect the pension fund and the employer, but the employee may find he does not have as adequate protection on the upswing as he had assumed. Controls on the downward movements help the employee except that the employer is protected by the usual pension-trust stipulation that the funds in the trust shall be the sole source of benefit payments. The employee may have greater protection during periods of poor common stock performance, but he does not participate in better performance of stocks during good times unless the cost of living has actually risen.

Conclusion.

There are many fascinating economic and social concepts involved in this new approach to retirement income. For example:

1. Materially higher standards of living will literally be thrust upon us in America in coming years. If we are successful in maintaining full employment, Americans should be living 30 per cent better than they now are by 1965, 70 per cent better by 1975. This is truly a fantastic rate of progress. Are we to exclude our retired people from their appropriate share of this increase in the standard of living or will we make some portion of it available to them? Because of the danger of inflation, fixed-dollar retirement plans do not even assure our older people a stable or satisfactory standard of living, let alone an increasing one.
2. By establishing CREF, we hope to make some of this expected increase in living standards available to college professors. This they can have by participating in the College Retirement Equities Fund, which invests their retirement savings in the common stock of General Motors, General Electric, Standard Oil (New Jersey, California, and Indiana), Sears, Penney, American Gas and Electric, Texas Utilities Company, International Business Machines, Aluminum Company of America, Bethlehem Steel—a total of 64 companies in 14 different industries. If American business prospers, college professors are not limited to a fixed-dollar retirement income, a static standard of living, while employed Americans are enjoying rapidly increasing standards. The equity or variable annuity for the first time makes it possible for large numbers of retired people to participate directly in the growth and productivity of the American economy.
3. Continued development of this country will call for huge sums of invested capital, some to come from borrowing and some to come from equities through retained corporate earnings and new common stock issues. This will increase the man-hour productivity of the American worker as well as the total product. And a substantial part of this invested capital, both borrowed and equity, can and should be supplied through the savings of our people for their old age.
4. In our desire to give the retired person a stake in the growth of the

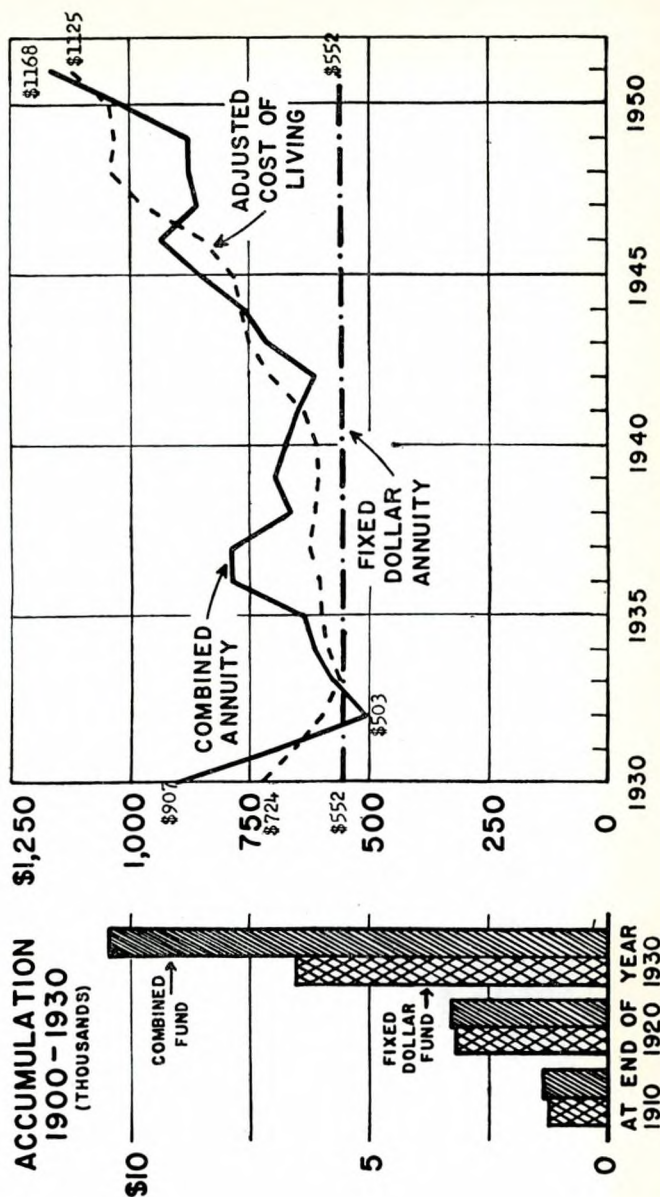
economy, we must not forget our responsibility for protecting him during periods when the economy is declining. We must not fail to have a solid fixed-dollar base of traditional annuities to protect our retired people during times of depression and to protect them against the swings of common stock performance that have always in the past far exceeded those of the cost of living. The balanced retirement program of fixed-dollar annuities plus equity annuities is a sound and conservative approach to the problem of retirement income, designed to provide a more secure income regardless of the direction in which the economy is moving at any one time.

5. Our efforts to maintain jobs for everyone will probably lead us to inflationary actions from time to time. Defense expenditures and other forces may also have their effect. Under traditional pension plans inflation leads to a *declining* standard of living for retired people, with resulting real distress.

Variable annuities seem to be the best answer yet proposed, permitting individual savings to be invested partly in equities. Thus the circle closes; the combined fixed-dollar and equity investments of workers, saving for their old age, can help expand American industries, roads, schools, homes, machinery, services. Increasing productivity will make it possible to improve the standards of living both for our workers and for our retired people.

AMOUNTS OF ACCUMULATION AND ANNUITY

Resulting from Investment of \$100 a Year

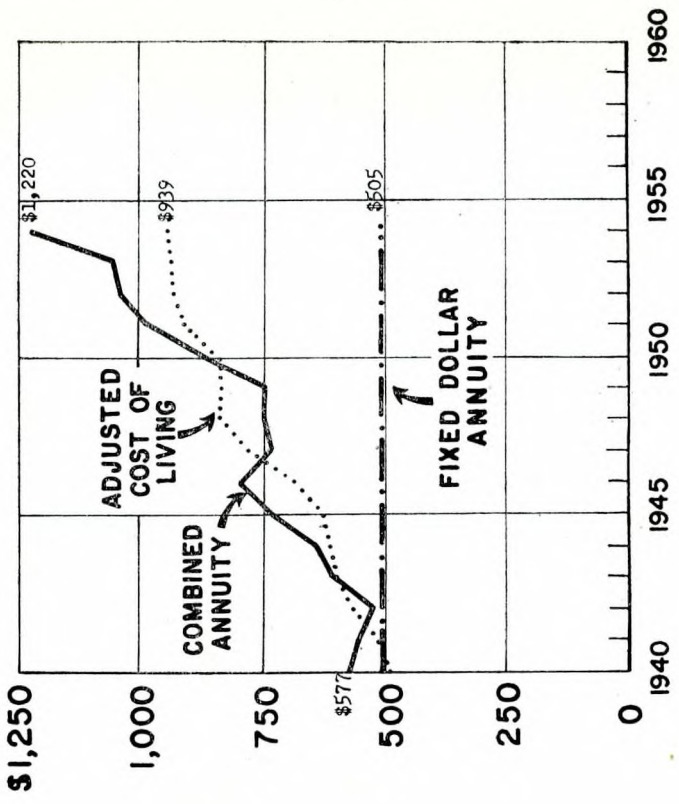


AMOUNTS OF ACCUMULATION AND ANNUITY

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EXHIBIT II

Resulting from Investment of \$100 a Year



ACCUMULATION
1910 - 1940
(THOUSANDS)

\$10

