J.V. Bruni and Company

1528 North Tejon Street
Colorado Springs, Colorado 80907
(719) 575-9880 or (800) 748-3409

Retirement Nest Eggs . . .
Withdrawal Rates and Fund Sustainability

Based on life expectancy data, an investor who retires at 65 can reasonably anticipate living another 20 years. Of course, some people will live longer than average and others less. The key point, however, is that people who expect to withdraw funds from their investment portfolio during retirement need to determine a long-term sustainable rate of withdrawal—that is, a withdrawal rate that can, with reasonable probability, be maintained for 20 years or more.

Given certain investment return and inflation assumptions, some retirement planning programs provide ways of determining the amount that can be withdrawn monthly from an investment portfolio without depleting it during one's lifetime. While these calculators are useful for determining how particular variables affect a portfolio and its sustainability, use of built-in formulas has drawbacks.

Since no one can predict the future with certainty, inputs required by retirement calculators must be assumed, and it may seem appropriate to use long-term average historical data. For example, one might choose to assume 3% as the expected inflation rate—the long-term average for the U.S. economy. While this rate may approximate average future inflation, the problem is that it is an *average* figure, and as such it ignores significant historical variation above and below average. Put differently, the rate we plug into a calculator typically remains constant over the forecast period, yet the real world is seldom constant. Thus, while we may capture correct averages, we almost always fail to capture fluctuations in rates of return and inflation.

Related to the problem of using averages is the issue of the timing of stock market returns and inflation. For example, even when stock market returns approximate the historically normal 10 to 11% per year, an investor who begins retirement shortly before *weak* years for the overall market will be more likely to drain a portfolio than a person who retires shortly before *strong* market years.

Rather than using long-term historical *averages*, the analysis in this article uses actual rates of return and inflation using monthly historical data for the S&P 500 and the Consumer Price Index (CPI) from 1926 through 2004. I examine all 58 twenty-year periods (January through December) since 1926 and track the value of a hypothetical retirement account, net of monthly withdrawals, to determine whether the account would have been depleted during each 20-year interval.

While past economic performance is not a guarantee of future results, this historical approach reveals the impact of realistic fluctuations in return and inflation. Over the past 80 years, the United States has experienced a world war, the Cold War and a war on terrorism, multiple recessions (even the Great Depression), simultaneous inflation and slow growth, wage and price controls, expansion in government regulation and ownership followed by deregulation and privatization, and control by each political party. In other words, the data of the last 80 years reflect a wide variety of economic and political conditions, and thus provide some idea of the variation we might experience in the future.

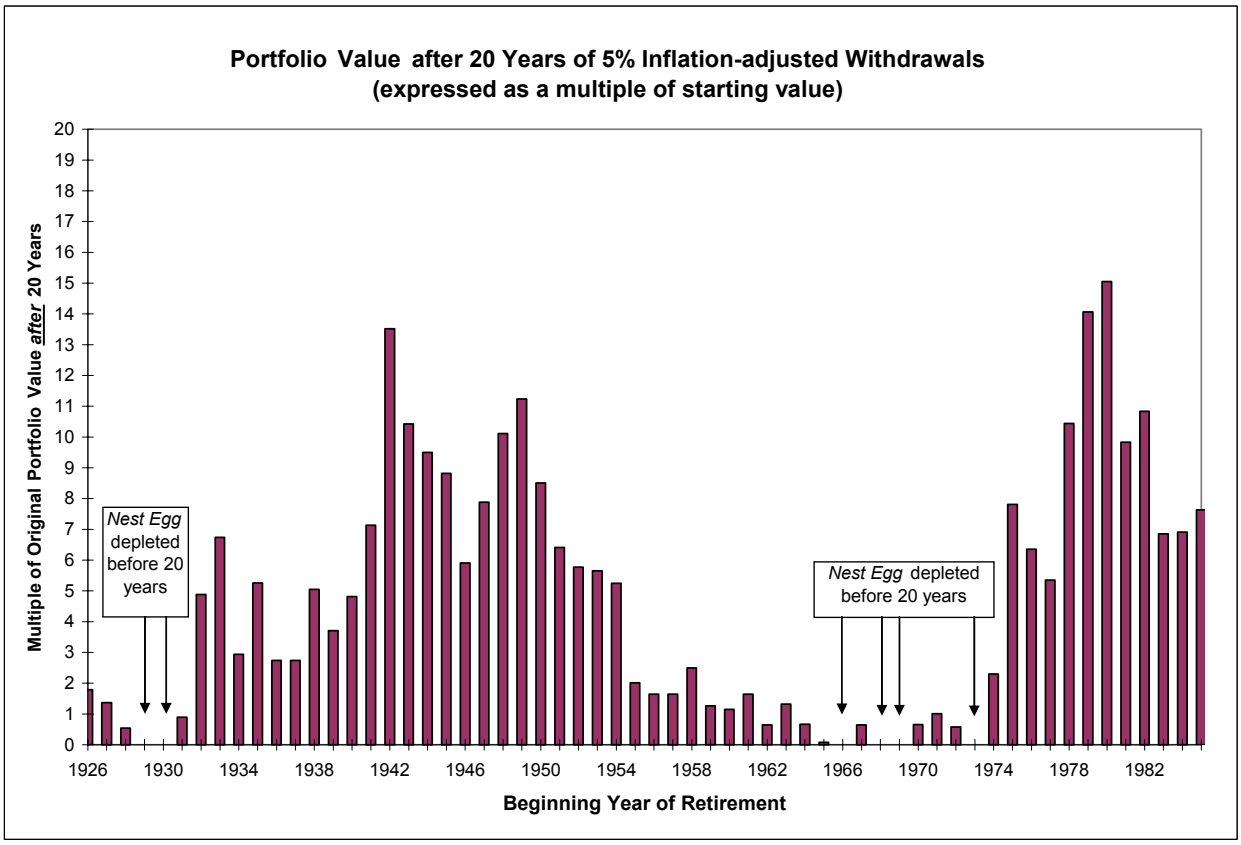
Consider the hypothetical case of Mr. Brown, who plans to supplement his retirement income with monthly withdrawals from his investment portfolio. Suppose he determines that an *initial* 5% annual withdrawal rate from his account will adequately augment his monthly pension and Social Security income. Should inflation occur, I assume that Brown's withdrawal amount would rise to maintain its purchasing power. Similarly, in the event of deflation (falling prices such as occurred during the Great Depression) his dollar withdrawal would be reduced accordingly.

Will Mr. Brown's 5% initial annual withdrawal rate (inflation-adjusted each month) be sustainable for 20 years? Answer: "It depends," a typical reply for most economists. Since S&P 500 returns and consumer prices fluctuated substantially over the past 80 years, the ending value of his nest egg would depend as much on when he retired as the amount he withdrew. As depicted in Chart 1 below, had his retirement begun in one of six specific years (two at the beginning of the Great Depression and four between 1966 and 1973), Mr. Brown would have run out of funds before reaching the 20-year mark.

On the other hand, had his retirement started in any of the other 52 years, Brown's ending account value would have been positive—in some cases his nest egg would have grown quite handsomely. For example, if he started his retirement in January 1980, withdrew at an inflation-adjusted 5% rate and

invested the balance in the S&P 500, his portfolio value on December 31, 1999 would have grown to over 15 times its initial 1980 value!

Chart 1



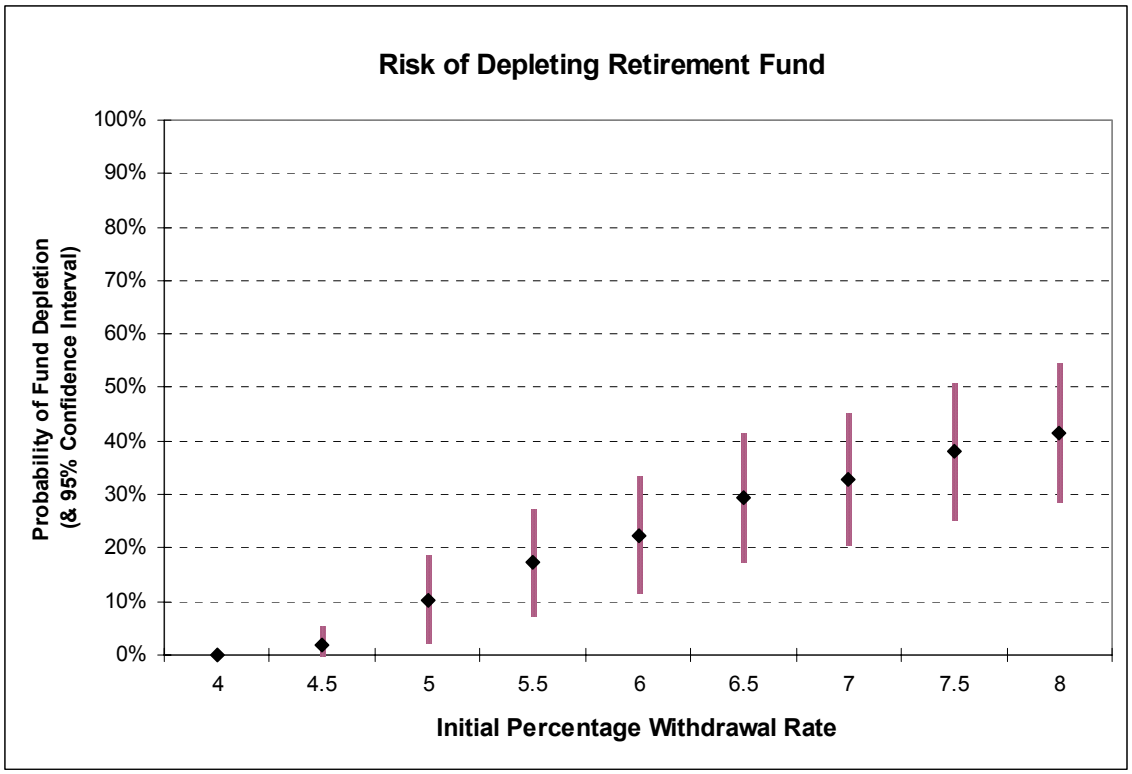
The wide range in ending value for the 58 different retirement periods is due essentially to timing. Retiring in the 1960s or early 1970s meant that the nest egg was either depleted entirely or had a lower ending value than for other periods. As many recall, during the turbulent times of OPEC oil shocks and other economic/political turmoil, the U.S. economy experienced recession or relatively slow economic growth combined with rapidly rising prices ("stagflation")—leading to an anemic stock market. Thus, if Mr. Brown retired early in or midway through this period, it was less probable that his 20-year withdrawal objective would have been met.

Paradoxically, while the *average* annual rates of growth for the S&P 500 over the 20-year periods starting in 1966, 1968, 1969 and 1973 were all greater than ***8%*** (and over 11% for 1973), had Mr. Brown retired in any of these years, his account would have been exhausted in less than 20 years—by ***5%*** withdrawals. This account depletion resulted in part because the S&P 500 performed poorly in the early years of retirement—and partly because relatively high inflation further strained the portfolio. Withdrawal amounts had to expand repeatedly to keep pace with the advancing CPI, which peaked

at a 13.3% annual increase in 1979. As Mr. Brown's situation illustrates, although long-term stock market *averages* provide useful information, without consideration of both the magnitude and the timing of fluctuations in rates of return and inflation, it is difficult to get an accurate reading of the sustainability of a retirement account.

I have also calculated the sustainability of Brown's nest egg for other initial withdrawal rates, from a low of 4% to a high of 8%. Chart 2 shows the probability of running out of funds at each rate. For example, at a 5% initial withdrawal rate, Brown's nest egg would have run dry in six of 58 twenty-year retirement periods—a 10.3% probability of depletion (consistent with Chart 1). In addition, the vertical bars in Chart 2 depict a 95% confidence interval above and below the average probability of fund depletion. That is, the probability of future account depletion is estimated with historical data, and with the use of statistics we can approximate a range of expected probability. For instance, had Brown chosen a 6% withdrawal rate, his account balance would have fallen to zero in 13 of 58 twenty-year retirement periods; and based on this historical data, we can be reasonably sure that the chance of running out of funds is between 12% and 33%. Obviously, as the withdrawal rate rises, the chance of exhausting one's nest egg also climbs. As shown in Chart 2, an 8% withdrawal rate generates a probability of over 40% that the account will go bust in less than 20 years.

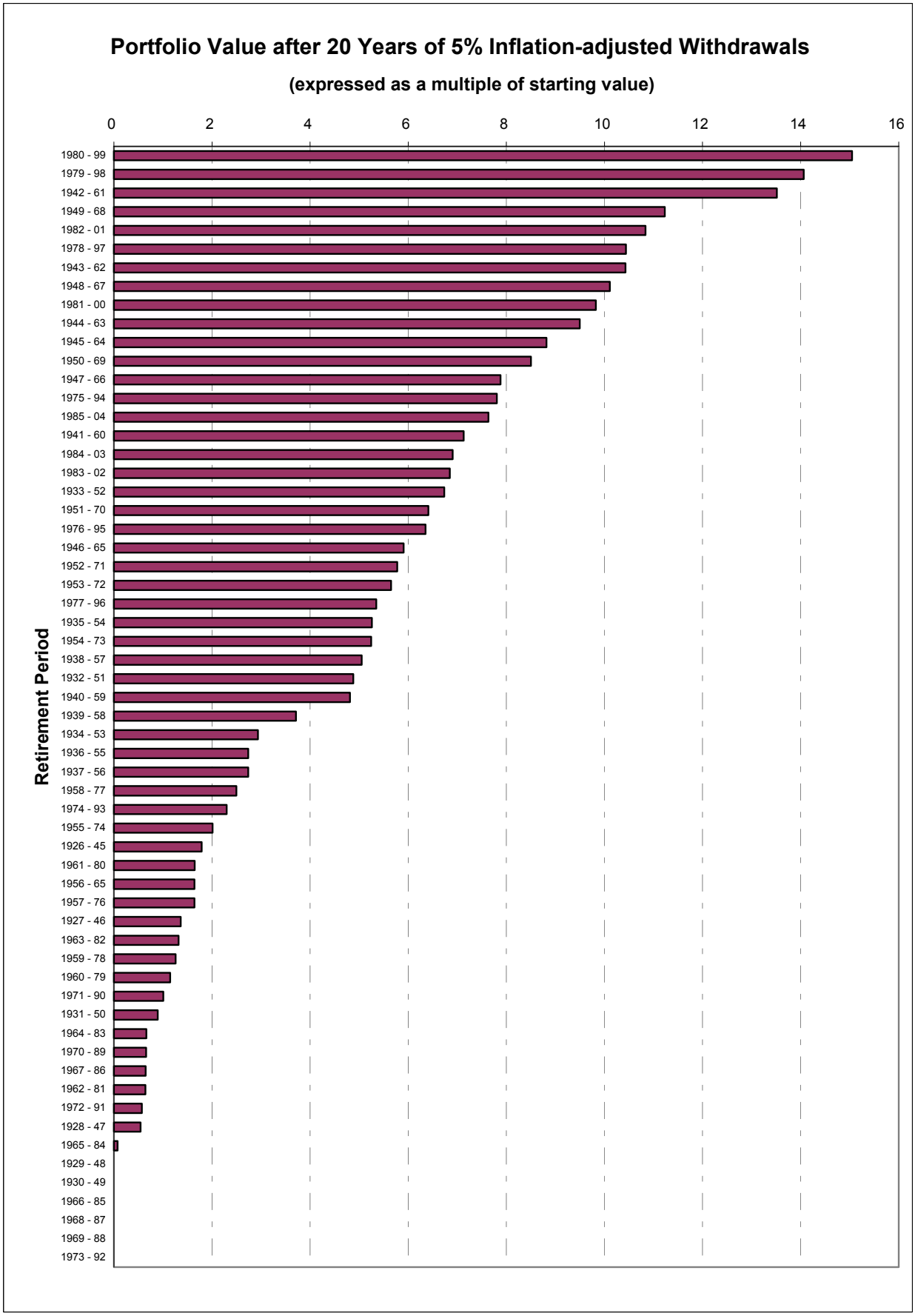
Chart 2



You can see why some researchers recommend an annual withdrawal rate of 4%. At this rate, Mr. Brown could have retired in any year from 1926 through 1985, and his nest egg would have survived a 20-year retirement. If the past is representative of the future, then a 4% withdrawal rate appears quite safe. However, some may argue that given the past 80-year history of stock returns and inflation, a 5% withdrawal rate—with only a 10% chance of depletion—represents an acceptable risk to bear.

So how should investors establish a withdrawal amount? In Chart 3, I show the same information displayed in Chart 1, except this time the 20-year ending multiples are displayed from highest to lowest. Note the extreme variation in the ending multiples—from a high of 15 times the starting value to a low of zero. This wide variation is essentially due to *one* factor—the timing of retirement. As you can see, for many retirement periods, the investor ends 20 years with a substantially larger portfolio. For example, a retiree who started with $600,000 and withdrew at an inflation-adjusted 5% per year from 1980 through 1999 would end with a portfolio valued at about $9 million—a multiple of 15 times the starting value.

Chart 3


Portfolio Value after 20 Years of 5% Inflation-adjusted Withdrawals
(expressed as a multiple of starting value)
0
2
4
6
8
10
12
14
16
Retirement Period
1980 - 99
1979 - 98
1942 - 61
1949 - 68
1982 - 01
1978 - 97
1943 - 62
1948 - 67
1981 - 00
1944 - 63
1945 - 64
1950 - 69
1947 - 66
1975 - 94
1985 - 04
1941 - 60
1984 - 03
1983 - 02
1933 - 52
1951 - 70
1976 - 95
1946 - 65
1952 - 71
1953 - 72
1977 - 96
1935 - 54
1954 - 73
1938 - 57
1932 - 51
1940 - 59
1939 - 58
1934 - 53
1936 - 55
1937 - 56
1958 - 77
1974 - 93
1955 - 74
1926 - 45
1961 - 80
1956 - 65
1957 - 76
1927 - 46
1963 - 82
1959 - 78
1960 - 79
1971 - 90
1931 - 50
1964 - 83
1970 - 89
1967 - 86
1962 - 81
1972 - 91
1928 - 47
1965 - 84
1929 - 48
1930 - 49
1966 - 85
1968 - 87
1969 - 88
1973 - 92

Indeed, if stock market return and inflation variation over the next 80 years resemble the past, then an initial 5% withdrawal rate, inflation-adjusted, will result in numerous periods when the portfolio balance after 20 years is many times its initial value. This result could prompt some retirees to chance making greater withdrawals, yet these same investors also want to guard against running out of funds.

One way to have your cake and eat it too is to follow the approach advocated in ***The Adaptive 5% Solution*** commentary—use a 5% withdrawal rate, then adjust the withdrawal amount annually according to changes in the portfolio's value. The benefit of this approach is, as the *Adaptive 5% Solution* states, "investors willing to tighten their belts after lean investment returns can relax their withdrawal limits to enjoy the fruits of better years." In other words, investors can enjoy the benefits of a greater withdrawal amount following strong market periods, but still protect against account depletion after market declines; thus making it more likely that the nest egg and adaptive withdrawals are sustainable over a long retirement.

John R. Brock, Ph.D.
Vice President