The Index Investor

Why Pay More for Less?

Model Portfolio Update

The objective of our first set of model portfolios is to deliver higher returns than their respective benchmarks, while taking on no more risk. The benchmark for the first portfolio in this group is an aggressive mix of 80% domestic equities, and 20% domestic bonds. Through the end of May, this benchmark had returned (4.6%), while our model portfolio had returned (1.7%). For the sake of comparison, we have also compared our model portfolios to a set of global benchmarks. In this case, the global benchmark is a mix of 80% global equities, and 20% global bonds. Through the end of May, it had returned (0.2%).

The benchmark for the second portfolio in this group is a mix of 60% domestic equities and 40% domestic bonds. Through the end of May, it had returned (2.8%), while our model portfolio had returned (0.2%), and the global benchmark had returned 1.1%.

The benchmark for the third portfolio in this group is a conservative mix of 20% domestic equities and 80% domestic bonds. Through the end of May, it had returned 0.8%, while our model portfolio had returned 2.0% and the global benchmark 3.7%.

The objective of our second set of model portfolios is to deliver less risk than their respective benchmarks, while delivering at least as much return. The benchmark for the first portfolio in this group is an aggressive mix of 80% domestic equities, and 20% domestic bonds. Through the end of May, this benchmark had returned (4.6%), while our model portfolio had returned (1.7%). For the sake of comparison, we have also compared our model portfolios to a set of global benchmarks. In this case, the global benchmark is a mix of 80% global equities, and 20% global bonds. Through the end of May, it had returned (0.2%).

The benchmark for the second portfolio in this group is a mix of 60% domestic equities and 40% domestic bonds. Through the end of May, it had returned (2.8%), while our model portfolio had returned (1.0%), and the global benchmark had returned 1.1%.

The benchmark for the third portfolio in this group is a conservative mix of 20% domestic equities and 80% domestic bonds. Through the end of May, it had returned 0.8%, while our model portfolio had returned 2.9% and the global benchmark 3.7%.

The objective of our third set of model portfolios is not to outperform a benchmark index, but rather to deliver a minimum level of compound annual return over a ten year period. Thus far this year, our 12% target return portfolio is down (0.8%), our 10% target return portfolio is up 0.5%, our 8% target return portfolio is up 4.3%, and our 6% target return portfolio is up 4.4%.

How Much Should I Save For Retirement?

One of the surest ways to cause an anxiety attack is to ask someone (or yourself), how much they need to save for retirement. The slight sense of panic most people feel when they hear this question is triggered by some combination of three underlying fears most of us have: we'll outlive our retirement savings, we'll see our purchasing power severely eroded by inflation, and/or we won't end up leaving as much money to our heirs as we'd like. One of the best ways to overcome these fears is to better understand the issues and trade-offs that underlie them. That is what this article will try to do. If, after reading it, you feel less panicked, then we will have achieved our goal.

We should start off by noting that the issue we are about to discuss is one that is not only very important, but also one which too many people don't understand as well as they should. The 2001 Retirement Confidence Survey found that while 67 percent of current workers report that they have saved something for their retirement, only 32 percent had tried to calculate how much money they actually will need to have saved so that they can live comfortably after they retire. Given this, it comes as no surprise that only 23 percent of current workers believed they were doing a good job of preparing financially for their retirement.

Why haven't more people tried to calculate how much money they need to save to pay for the retirement they want to enjoy? Earlier this year, Alan Greenspan suggested one reason, when he noted that "one of the most complex economic calculations that most workers will ever undertake it without doubt deciding how much to save for retirement." In short, many workers may simply find the calculation too difficult to do on their own. Academic research by Professor Annamaria Lusardi has also suggested another potential explanation: people are afraid of what they may find out. Avoiding this issue, however, may only compound future problems. Using data from the Health and Retirement Study, Lusardi found that 54 percent of retirees who had not planned for their retirement rated their retirement years as not as good a s their working years, while 79% who had thought a lot about retirement rated it as better or about the same as their working years. In summary, the data suggest that, painful or not, this is an issue that all of us are better off confronting now rather than putting off until later.

With that boost to our courage, let's start by looking at the different ways you can convert your savings into income after you retire. Broadly speaking, there are two different approaches you can take.

Option number one is to convert your savings into an annuity. Technically, an annuity is "a contract providing for the payment of a sum of money at regular intervals for a specified period of time." The simplest form of this product is called an "immediate life annuity." It is issued by an insurance company, and promises to pay you a fixed amount of money each year until you die. In effect, a life annuity is an insurance product which pools the risk of individuals outliving their savings during their retirement years. The amount you have to pay for this annuity depends on three factors: your desired annual income, the interest rates prevailing at the time you purchase the annuity, and the insurance company's estimate of how much longer you will live. The principal advantage of a life annuity is that you won't outlive your savings. However, there are also three important disadvantages.

First, when buying an annuity you are taking on the credit risk of the insurance company that issues it. If that company goes out of business, your payments may cease. The best way to hedge this risk is to only purchase annuities from insurance companies that have received very high credit ratings from A.M. Best (a firm that specializes in rating insurance companies), Standard and Poors, or Moody's. However, as Enron has recently shown, a high rating today is not a guarantee that the company in question won't run into problems in the future.

The second disadvantage to a life annuity is that none of the savings you use to buy it can be left to your heirs, even if you die earlier than you anticipate. Remember, annuities are basically insurance contracts, with the savings from people who die earlier than expected offsetting the costs of those who live longer. However, because this issue is so important to people, insurance companies offer products called "period certain" annuities, which promise to make payments over at least a fixed minimum period of time (e.g., twenty years), either to you or to a secondary beneficiary (e.g., a spouse) who survives you. However, because these fixed period guarantees reduce the funds that the insurance company can use to pay benefits to annuity holders who live longer than expected, period certain annuities are more expensive than life annuities.

The final disadvantage of a life annuity is that its payments are usually fixed, and do not grow with inflation over your retirement years. To see the problems this can cause, look at the following table, which shows how the purchasing power of one dollar declines over time at different average annual rates of inflation:

	After 10 Years	After 20 Years	After 30 Years
2% inflation	.82	.67	.55
3% inflation	.75	.55	.41
4% inflation	.68	.46	.31
5% inflation	.61	.38	.23

Obviously, the way to offset this risk would be to have the annual annuity payments indexed to inflation, so that they stayed constant in real terms. This is the way Social Security works in the United States. However, due to the complexities involved in managing the inflation risk, only a few companies have decided to offer inflation indexed annuities in the United States (e.g., Lincoln National Life). However, given the larger number of companies offering this product in other countries (notably the U.K.), one would expect more of them to appear in the future in the U.S.A.

The second option for converting your retirement savings into retirement income is to do it yourself – that is, continue to manage your own portfolio. This approach has some important advantages, including the increased control and flexibility it offers, not only to vary income levels, but also in the ways you can manage the transfer of your assets over time to other parties (e.g., heirs and charities). It does, however, have disadvantages too. First, unlike an annuity, this approach does not benefit from risk pooling. As a result, it generally requires more initial capital (that is, a higher level of savings). Second, this approach requires you (or a professional advisor) to invest your portfolio in a manner that ensures you won't outlive your savings and inflation won't erode their purchasing power. If you (or your advisor) gets it wrong, you could find yourself living exclusively on Social Security.

Now that you have a better idea of the two main approaches you can take to converting your retirement savings into income, its time to move on to our quantitative analysis.

To give you a better, though albeit, a rough idea of the amounts of money you will need to accumulate before you retire, we looked at sixteen different people, all of whom are now forty five years old. The main differences between them are the ages at which they wish to retire (55, 60, 65, and 70), and their target annual retirement incomes, expressed in today's dollars ($25,000, $50,000, and $100,000). When choosing between these amounts, keep in mind that half of current retirees have an income that is equal to eighty percent or more of their pre-retirement incomes. The other difference between our sixteen different people has to do with the future availability of Social Security benefits. Much has been written about the potential impact of baby boomer's retirement on the financial viability of Social Security. While numerous scenarios have been proposed, we have considered only two, where Social Security benefits become "means tested" in the future (that is, available only to people whose incomes are at or beneath a cut off level), and as a result either are or are not available to those people desiring $100,000 retirement incomes.

At the end of this article, we will present our results for thirty two different cases, which include rough cost estimates for life annuities and self-managed plans for all sixteen of our people (the cost of period certain annuities generally lie in-between these two extremes, and so are not presented here). To start with, however, it will be helpful to walk through a single example in detail, which will focus on someone who wants to retire at age sixty, and enjoy an annual retirement income (expressed in today's dollars) of $50,000 per year.

As we noted above, one issue is whether or not Social Security benefits will be available. In this case, we have assumed that they will be. However, because the actual Social Security benefit paid depends on so many factors (e.g., the highest income achieved, etc.), we have had to simplify our model, and use only three levels of benefit (which roughly correspond to actual benefit levels paid today). We assume that people desiring an annual retirement income of $25,000 will receive $13,000 in Social Security, people desiring an income of $50,000 will receive $19,000 in Social Security, and people desiring an income of $100,000 will receive either $25,000 or nothing at all from Social

Security. The difference between these desired retirement incomes and the amounts received from Social Security is the annual income that will have to come from personal savings accumulated before retirement: respectively, either $12,000, $21,000, $75,000, or $100,000.

Having addressed Social Security, the next issue to deal with is the future value of these amounts. The question is, what inflation rate do we use to convert amounts expressed in today's dollars into amounts expressed in future dollars (if we didn't do this, the target retirement incomes would not be able to purchase the standard of living our future retirees desire). We decided to use 3.1%, which is the average rate for the period 1926-2000. It is also very close to the 3.0% rate used by the Social Security Administration in its "most likely" future scenario, as described in its 2002 Annual Report. The formula for converting today's dollars to inflated future dollars is quite straightforward: future dollars = current dollars x[(1+ expected inflation rate) raised to Nth power], where N equals the difference between a person's age today and their desired retirement age. Our forty five year old example wishes to retire at age sixty, with a post retirement pre-tax income of $50,000 per year, expressed in today's dollars. We have estimated that Social Security benefits (which are indexed for inflation) will cover $19,000 of this amount, leaving $31,000 to be financed from personal savings. Fifteen years from now (60-45), given a 3.1% annual rate of inflation, you will need $49,005 [$31,000 x $(1+.031)^{15}$] to have the same purchasing power as you do with $31,000 today.

So, how much would it cost to buy, 15 years from now when our friend reaches his or her target retirement age of 60, a life annuity that will pay $49,005 per year until he or she dies? Two determine this answer, we need to estimate two other variables. The first is how much longer beyond age 60 our friend is going to live. We used the 1999 life expectancy tables from the National Vital Statistics Report (published by the U.S. Department of Health and Human Services) to obtain our estimate of 22 years. The actual life expectancy tables used by the insurance company are confidential, but they probably use a slightly longer life expectancy because they take into account two important facts: first, life expectancies have been increasing as medical technology and health care have improved, and second, research has found that people who buy life annuities tend to live longer than "average" people of their age. This difference will probably cause our estimate of the cost of the life annuity to be on the low side.

The second thing we need to know is the likely rate of return the insurance company will be able to earn on the funds it receives from our 60 year old retiree. This calculation is specific to each insurance company, as it depends on the mix of future liabilities it is trying to fund. In the interest of conservatism, we have assumed that the liability for making annuity payments is funded with investments in bonds. We know that the yield on a bond is composed of two factors: a "real" return plus expected inflation. We have already said that we expected inflation to average 3.1% per year, so what we really need is an estimate of the real return. Fortunately, it is easy to find this. Since 1997, the U.S. Government has been selling "Treasury Inflation Protected Securities", which are known as TIPS (the Australian, Canadian and UK governments have been selling them even longer). These bonds guarantee a constant real return above the rate of inflation. Most recently, the average real return on ten and thirty year TIPS was around 3.15%. To generate our estimated rate of return on the life annuity, we therefore combined an expected inflation rate of 3.10% with a real yield of 3.15% to derive our estimate of 6.25%.

Given these variables (a rate of return of 6.25%, a desired annual payment of $49,005, and an expected life of 22 years) we then estimated that the cost of the life annuity (assuming that its annual payment was made at the beginning of each year) would be $606,822. This is the amount our 45 year old would have to accumulate by his or her target retirement at age 60 in order to purchase a life annuity that paid $49,005 per year. (Note: an online pricing service, www.immediateannuity.com quotes the same annuity as costing $595,340, so it looks like we're pretty much on target with our estimate). As you recall, however, this payment will not increase with inflation, while the payment received from Social Security will. An interesting question to ask, therefore, is how much purchasing power our annuity buyer will lose over time, assuming inflation stays at the expected rate of 3.1% per year. After 22 years, the annuity payment of $49,005 will have only 53% of the purchasing power it did in the first year it was received. Thanks to Social Security's inflation indexed payments, however, the purchasing power of our friend's total retirement income will have fallen to only 71% of its initial value.

Now let's turn to our friend's second option for converting her savings into post retirement income: doing it herself. The easiest way to implement this approach is to, in effect, design your own annuity. Let's say that for conservatism's sake, our friend decides that she might live to be 100, and wants to make sure her savings last until she gets there – that is, that they are large enough to generate $49,005 per year, adjusted for inflation, for forty years after her retirement. Assuming she plans to invest all her retirement savings in a portfolio of inflation protected government bonds (which would generate higher returns if inflation goes up, enabling her to take out more than $49,005 per year, and thereby maintain the real purchasing power of her income), she would use the same 6.25% rate we used for our insurance company annuity calculation. However, instead of an expected life of 22 years, she would use her "hoped for" life of 40 years. These inputs yield a cost (that is, a target savings level by age 60) of $759,376. Remember, the nature of an annuity is that each year the payment you receive contains both interest on your savings and some reduction in capital. If our friend lives to be 100, her savings would be used up in that year. If she died sooner, the unused savings would become a bequest to a party or parties she would need to specify in her estate plan.

Suppose, however, that our friend wanted to make a substantial bequest after she died. To simplify this, let's say that she wanted to accumulate enough savings so that after retirement the earnings alone on those savings would equal her target income. In other words, her goal is to have her savings earn at least $49,005 annually, adjusted for inflation (that is, with no loss in purchasing power over time), without reducing her capital (as would be the case with an annuity). How much would she need to accumulate before she retired?

The big question here is how our friend should allocate her post retirement savings across different asset classes. To simplify the example, let's assume she can choose between just two asset classes: inflation protected bonds or an S&P 500 equity index fund. The advantage of investing in the equities is that they have a higher expected real return (9.78 percent, on average, over the 1926 – 2000 period) than do the inflation protected bonds (3.15%). Because of these higher expected returns, it would appear that the higher the proportion of her post-retirement portfolio invested in equities, the lower the amount of savings she needs to accumulate to reach her income target of $49,005 per year.

For example, let's start with one extreme, and assume 100% of her portfolio was invested in inflation protected bonds. In this case, to achieve her target income goal she would have to accumulate savings of $1,604,724 by the time she reached her target retirement age of 60. The way to calculate this is to divide $49,005 by the difference between the expected return on the bonds of 6.25%, and the expected rate of inflation 3.10% ($49,005/3.15%). This yields $1,555,714, to which we add an additional $49,005 to cover the first year's income, resulting in a savings target of $1,604,719.

Now assume that our friend plans to invest only 60% of her retirement savings in inflation protected bonds, and the remaining 40% in equities. As noted above, the expected return on the bonds is 6.25%. The expected return on the equities is 12.88%, reflecting the 9.78% average real return plus the expected inflation of 3.10%. Given the 60% bonds, 40% equity weighting, the expected portfolio return is 8.90%. To obtain our savings target, we therefore divide the $49,005 income target by 5.80% (8.90% less expected inflation of 3.10%), which equals $893,630. Seems pretty straightforward, right? Our friends should just invest more in equities, and save less today – or should she? We did a simulation analysis to find out.

Two variables in our simulation are uncertain: the future rates of inflation during each year of our forecast period, and the future returns on equities. To estimate inflation, we used historical data for the 1926 – 2000 period, including the average annual rate of inflation (3.10%), and its standard deviation (1.95%). However, because inflationary episodes tend to be grouped together in periods of time, we also had to estimate the correlation of this year's rate of inflation with the previous year's rate. Here we also used the historical rate for the 1926-2000 period, or .55.

We estimated future rates of return on equities using the historical average real annual return of 9.78% and the standard deviation of these historical real returns of 21.56%, and the rate of inflation prevailing in the forecast year (note: there was essentially no correlation between inflation and real equity returns over the 1926-2000 period).

To compare the impact of the two investment strategies, we looked at the 40th year after the target retirement date. In other words, if our friend lived to be 100, would she have any savings left? Where the portfolio was 100% invested in inflation indexed bonds, the answer was an unqualified yes, regardless of the rate of inflation that prevailed after our friend retired. However, where 40% of the portfolio was invested in equities, the probability of having any savings left by age 100 was only 55% (meaning there was a 45% chance that if our friend lived to 100, she would get there living on Social Security alone, and with no savings left to pass on after she died).

Why did this happen? What caused this shortfall? In some of the simulations, the portfolio experienced a string of years during which the amount taken out for income purposes was substantially more than the amount it earned on its investments. If this happened in the early years following retirement (before any cushion was built up), and/or if this was followed by a burst of high inflation, the effect was devastating – in effect, it dug a hole from which the portfolio could not recover. Of course, what we didn't model was a cut back in income which could have slowed down the rate of portfolio depletion – but that wasn't our goal, which, as you recall, was to maintain a constant real income throughout retirement. Nevertheless, this simulation very clearly shows how it is possible to outlive one's assets if you aren't careful about managing your portfolio's downside risk after you retire.

As we described earlier, the following tables extend our analysis to people desiring to retire at age 55, 60, 65, and 70, with target post-retirement pre-tax incomes of $25,000,

$50,000, $100,000 and $100,000 without any Social Security benefits. We have calculated the savings that would be needed by the target retirement age to meet the income target via the purchase of a life annuity and via the investment of 100% of capital in inflation protected bonds, with no reduction of principal. As you can see, the amounts required increase slightly with age, which may seem counterintuitive. Two underlying forces account for this. First, the value of our target income after Social Security payments grows each year at our expected inflation rate (3.1%). Over time, this causes the savings needed to achieve it to increase. Pulling in the other direction, however, is the fact that a person's expected years of remaining life declines with age. As the years of expected remaining life decline, so too should the required level of savings. What our tables demonstrate is that once inflation rises above a certain level, its impact more than offsets declining life expectancy, and the amount of savings needed to achieve the target level of income increases with age.

Of all the different approaches we explored, these two (life annuity and 100% preservation of capital) provide the lowest and highest amounts of savings needed to meet the post retirement income targets. Finally, we stress that because of the assumptions we have used, these estimates are only rough guidelines to the amount of money that needs to be saved in order to meet one's retirement income goals.

Life Annuity Approach

	55	**60**	**65**	**70**
$25,000	$217,835*	$234,899	$247,203	$253,715
$50,000	$562,742	$606,822	$638,609	$655,430
$100,000	$1,361,472	$1,468,118	$1,545,021	$1,585,718
$100,000 no Social Security	$1,815,296	$1,957,490	$2,060,029	$2,114,291

* These amounts are expressed in future (inflated) dollars corresponding to the target retirement year.

Inflation Indexed Bonds, No Capital Reduction Approach

	55	60	65	70
$25,000	$533,245*	$621,183	$723,624	$842,959
$50,000	$1,377,549	$1,604,724	$1,869,363	$2,177,645
$100,000	$3,332,780	$3,882,397	$4,522,653	$5,268,495
$100,000 no Social Security	$4,443,706	$5,176,529	$6,030,204	$7,024,660

* These amounts are expressed in future (inflated) dollars corresponding to the target retirement year.

At first, the numbers in these tables seem intimidating, as well they should. Survey after survey has found that most Americans have underestimated the savings they will need to accumulate in order to achieve their retirement income goals. On the other hand, if one starts early enough, saves regularly, and invests wisely, these savings levels can be reached. Consider what it takes to retire at age 55, with an income of $50,000. Using our most conservative case (retirement portfolio 100% allocated to inflation indexed bonds, and with no reduction of capital to meet income needs), you would need to accumulate $1,377,549, as shown in the table above. You could reach this by saving $12,160 per year starting at age 25, assuming your compound annual portfolio return over the ensuing 30 years was 8%. If you assume a slightly higher 10% compound annual return, you would only have to save $8,374 per year to achieve your retirement savings goal. Clearly, these are not easy amounts to save, but neither are they impossible for many people.

What it really comes down to is the trade-off you want to make in your own life between consumption today and consumption after you retire. Americans' low average savings suggest that they have, consciously or not, chosen high levels of consumption today, and quite low levels after they retire. Our guess is that this transition will eventually prove to be a very difficult one for a lot of people to make. In our opinion, a much better approach (or at least one that will prove to be psychologically easier after retirement) would be to save more and consume less today, so that the reduction in consumption after you retire will be less sharp. Whatever the trade-off you decide to make, we hope that the analysis in this article will help you to make it consciously, with your eyes wide open, and not by accident.

The Rising Real Cost of Feeling Middle Class

We expect that many people will have read the previous article and asked themselves "how am I ever going to be able to save that much?" We have two comments on the subject.

The first is that over time, due to the effects of compounding, even a little bit of extra saving can generate substantial amounts of future retirement wealth. For example, if you save $100 per month for thirty years, and earn 10 percent per year on those savings, you will end up with $226,049. The real secret is starting early and having the discipline to stick with your savings program.

That discipline, however, is increasingly difficult to maintain. Why? Because what we call "the real cost of being middle class" has been increasing in recent years. Here's what we mean. Most attempts to define what it means to be "middle class" use some type of income measure. A common example of this is to define "middle class" those households earning between one half and two times the median household income. In our minds, however, this is too rigid a definition, and fails to sufficiently take into account the differing circumstances (number of children, health status, etc.) of different households.

Given this, our definition of what it means to be middle class is less precise, but perhaps closer to most people's emotional understanding of the term: it means feeling secure about your ability to afford (a) owning your own home; (b) satisfactory health care; (c) higher education for your children; and (d) an adequate retirement income. One of the reasons the last of these is becoming increasingly out of reach for many people is because they are spending more and more money trying to achieve the first three of these goals.

A quick look at the data will make our point more clearly. We should note at the outset that because we are using the most recent data available, the starting and ending dates don't always match up perfectly. However, they are close enough that our conclusions aren't affected.

Let's start with incomes. Between 1990 and 2000, the median household income in the United States, measured in current dollars, increased from $30,126 to $42, 151, or 3.4 percent per year. During this same period, the consumer price level (inflation) increased by 2.8 percent per year. In other words, in real terms (that is, constant inflation adjusted dollars), the average household in the United States saw its income rise by about .6 percent per year.

Unfortunately, during this period, the cost of staying in the middle class was rising even faster.

Between the fourth quarter of 1991 and the fourth quarter of 2001, the price of the average house in the United States (as measured by the Office of Federal Housing Enterprise Oversight National House Price Index) rose by 4.34 percent per year in nominal terms (that is, current dollars), or approximately 1.5 percent above inflation.

Between January, 1992 and January 2002, the cost of medical care (as measured by the medical care component of the consumer price index) rose by 4.2 percent per year in nominal terms, or about 1.4 percent above inflation.

Finally, according to the U.S. Department of Education, between 1990 and 2000, the cost of tuition, room and board at a four year university rose by approximately 5.2 percent per year (it was about the same for both public schools and private schools). This was 2.4 percent above (or almost double) the rate of inflation.

In short, if you looked only at real incomes, you might think that the average household in the United States had done pretty well over the last decade. However, when you look at the cost of staying in the middle class, you see a very different picture indeed. While knowing this won't make it any easier to find that money each month to save for your retirement, we hope that it will be good to know that you're not alone in finding this an increasingly difficult challenge.

Managing Your Family's Financial Risks

With their middle class status harder and harder to maintain, many people find themselves worrying more about the financial risks they face. Too often, these worries appear as fleeting thoughts that cause a sharp rise in anxiety before they disappear (or are forcibly pushed out) of our minds. What most people are missing is a sense of control over the risks they face. With that in mind, we offer the following framework for thinking about them. While this won't make the risks go away, we hope that it will give our readers more of a sense of control over them, and in so doing reduce the anxieties they create.

Broadly speaking, an unexpected reduction in your family's economic well being can come from four different directions: a fall in your income, a rise in your expenses, a fall in the value of the assets you own, or a rise in the value of your liabilities. Let's look at each of these in turn, and what you can do to mitigate the risks they pose.

As a society, we do a pretty good job of helping people hedge the risk of an unexpected fall in income. For example, governments provide unemployment insurance, and both employers and the government (via Social Security) provide disability insurance. Governments further cushion the potential impact of a loss of income via the provision of subsidized housing and food, and the earned income tax credit. Finally, both the private sector and the government (again, via Social Security survivor benefits) provide various forms of life insurance to hedge the impact of premature death, as well as lifetime annuities to hedge the risk of outliving one's assets after retirement.

At the individual level, we can also reduce risks in this area through continuing education and networking (which help maintain our employability), as well as by building up an emergency fund of liquid savings that can be used to temporarily cover a short term income loss.

The second major threat to our economic well being comes from an unexpected increase in our expenses, which can also be thought of as the sudden appearance of an unexpected liability on our balance sheet. Most of the major potential sources of these unwanted surprises can be hedged via insurance. For example, car insurance typically covers both potential liability judgements (that is, payments to others to cover damages they sustain in an accident involving you), and collision damages (payments to repair damages to your vehicle). Similarly, house insurance typically covers both potential liability judgements, and casualty losses from fire, theft, and the like. Finally, health insurance generally covers a substantial portion of unexpected increases in our expenses in this area. Beyond insurance, we can also take other actions to limit our exposure to risks in these areas. Examples of these include driving carefully, keeping household systems (electrical, plumbing, etc.) and maintenance up-to-date, and sticking to a healthy diet and exercise plan.

The third threat to our economic well being is a sudden decrease in the value of our assets. When it comes to our financial assets, perhaps the best hedging approach is to maintain a well diversified portfolio. More narrowly, from time to time it may be possible to further hedge the value of specific financial assets or asset classes by buying put options on them. On a long term basis, however, this is generally a far more expensive strategy than diversification. When it comes to our real assets (e.g., house, car, jewelry, etc.), our options are much more limited. While casualty losses (fire, theft, etc.) can be insured against, declines in market value generally are much more difficult to hedge. Until instruments that perform this function are introduced (and they have repeatedly been discussed when it comes to real estate values), our best bet is to choose our real assets wisely (e.g., buy a house in a town and neighborhood where values are expected to increase; study resale values before buying a car, etc.).

The fourth threat to our economic well being is an unexpected increase in the value of the liabilities on our balance sheet. For most families, there are three of these: mortgage debt, installment debt (credit card and car loans), and the expected future cost of children's college educations. Thus far, only one of these risks is easy to hedge. In the case of mortgages, we can limit the risk of a sudden increase in interest rates by obtaining a fixed rate loan, or, alternately, a floating rate loan with some type of "cap" which limits the maximum rate of interest we have to pay. Car and credit card loans are more problematic. While the former are often made at a floating rate, the latter are not. In this case, our best hedge is to limit our credit card debt when interest rates are rising. Finally, in the case of college costs, a few states offer "prepaid tuition" plans that effectively "lock in" a portion of future costs (usually tuition, but not room and board), but these are typically only narrowly applicable to state colleges and universities. Unfortunately, the ideal plan – that is, one which enables you to lock in the future cost of college, while keeping the choice of which college to attend open – has not yet made its appearance. Until it does, the best advice is to start saving early, and make sure you thoroughly understand the financial assistance options (grants, scholarships, loans, etc.) that are available to help pay for your children's college educations.