

A Leap of Faith

ON JANUARY 7, 2009, Andrew Verstein, then a third-year law student, did something that would scare the daylights out of most of us. Andrew took most of his hard-earned retirement savings, \$4,770 of it, and took a leap of faith—by buying a LEAP, a December 2011 option to buy 100 shares of an index based on the S&P 500.

Many of you will instinctively think that Andrew was acting recklessly, but we hope to show you that just the opposite is true. Andrew has it right—he stands a good chance of retiring with 50 percent more savings than he'd expect using conventional strategies, while significantly reducing his risk.

Before deciding whether Andrew was reckless or brilliant, let's pause to explain just what he did. LEAP is the acronym for Long-term Equity Anticipation, which is a fancy way of saying a long-term stock option. Andrew's option gave him the ability to buy 100 shares in the SPDR (pronounced Spider), a fund designed to mimic the performance of the S&P 500 index. A SPDR share is just like one-tenth of the S&P 500 index.* Andrew's option allows him to buy SPDR shares at \$45. That's like an option to buy the SPDR shares at half price. Of course, the option wasn't free. He paid \$47.70 a share or \$4,770 in total for that privilege.

For Andrew to make money, the SPDR price has to be more than \$47.70 above \$45 a share, or \$92.70. To the extent the market goes above 92.70, Andrew will make money—at double the rate he would if he had

*On January 7, the index opened at 927.45, while the SPDR opened at 92.00.

just invested his \$4,770 in the S&P directly. His \$4,770 would only have bought 52 shares directly; with the option, he has exposure to 100 shares. But if the market goes down, Andrew loses money twice as fast, too. If the index ends up being worth less than \$45, he will have lost his entire head start on retirement savings.

Gambling His Retirement?

Andrew is remarkably thrifty, perhaps to a fault. Before law school he worked for a year as a paralegal, and the job took him to Paris, Milan, and Mexico City. As a result, most of his living expenses were taken care of, allowing him to save a prodigious amount even on a modest salary. He probably should have enjoyed more of the local color, cappuccinos at the street cafés, but that isn't his style.

So why is Andrew taking this gamble with his retirement? The short answer is he was convinced that buying the LEAP is a prudent investment—not because he was sure the stock market is going up and wanted to make a short-term killing. In fact, after the volatile stock swings of 2008, Andrew's not sure at all about whether stocks will increase or decrease over the life of his option. But he sees this purchase as part of a conservative, long-term strategy to invest for his retirement. Andrew read an early draft of an academic article we wrote on diversification across time, and he followed up by asking how it would be possible for him to put the article's theory into practice. We wrote this book to let you in on that conversation.

To get the long answer, we go back to work done in the 1960s by Paul Samuelson and Robert Merton. In their groundbreaking articles, they ask how someone who had all of his or her retirement savings up front in cash would choose to allocate it between stocks and bonds.¹ Imagine for a moment that you are twenty-five and inherit a \$500,000 trust fund that can only be spent when you reach retirement age. How would you invest it today between stocks and bonds?

Your answer would obviously depend on your tolerance for risk and the expected returns on stocks and bonds. For the sake of argument, let's say that your allocation is 60:40, 60 percent in stocks and 40 percent in

bonds. Now we have to translate this situation back to the real world, where, alas, no one has left you with such an inheritance.

Put yourself in Andrew's shoes. You're twenty-five, soon to be a newly minted JD, and you've saved \$5,000 for retirement in your IRA. How would you invest that money between stocks and bonds?

If your answer is 60:40—put \$3,000 in stocks and \$2,000 in bonds—you've fallen into the trap. This is the mistake that most people make. This fails to consider that Andrew's future salary is much like a bond. The average starting salary at New York law firms is above \$150,000. On that salary, Andrew plans to put away at least \$10,000 a year into a 401(k) plan. And the amount saved will go up with promotions and inflation. Those savings contributions are like mortgage payments, though he hasn't borrowed any money. Instead, his 401(k) plan is like the bank, collecting payments that are worth \$500,000 from today's perspective.

Here is Paul Samuelson's investment advice for someone just like Andrew:

If you are a young professional with future [earnings that] cannot be efficiently capitalized or borrowed on, to keep your equities at their proper fraction of *true total wealth*, you should early in life put a larger fraction of your liquid wealth in common stocks.²

Most of Andrew's true total wealth is tied up in his human capital and over time this will be converted to financial capital. In theory, Andrew could go out and sell his future savings contributions to someone who would give him \$500,000 today in return. In practice, no such markets exist. Just like the trust fund kid, Andrew has something worth \$500,000 today that he doesn't have access to. His anticipated future savings is like owning a half-million bond that is stuck in his portfolio. Fortunately, money is fungible and so Andrew can compensate by overinvesting the parts over which he does have control.

If he were to invest his current \$5,000 savings 60 percent in stocks and 40 percent in bonds, then it would be as if he had \$3,000 in stocks and \$502,000 in bonds. Were he to invest all \$5,000 in stocks, he would still

be below 1 percent in stocks. Even if he were to leverage his \$5,000 investment at a 2:1 ratio, so that he has exposure to \$10,000 of the market, he would be 2 percent in stocks, far below his desired ratio of 60 percent. Investing with leverage won't get him to 60:40, but it moves him in the right direction. Viewed from this perspective, we hope you can see that what Andrew did in exposing himself to \$10,000 of stock risk isn't at all radical. From a more holistic perspective, he put less than 2 percent of his true savings at risk.

Andrew knows that he is just starting out. He wants to learn what he is doing when the stakes are \$5,000, not \$100,000 or \$500,000. As Andrew explained to us: "When I wanted to learn something about sports, I decided to make some small bets. That way I had a real incentive to learn about the players and the game. When it comes to stocks, this is giving me a chance to learn while the stakes are still small."

Andrew played a bit of poker in college. He was even good enough to win some small tournaments. But he's not a gambler. Those tournaments had buy-ins of \$2, and Andrew walked away with \$100. If he were to get better at playing poker, Andrew knew he'd have to raise the stakes, and that isn't how he wanted to spend his time. In the case of investing for retirement, however, he couldn't afford just to sit on the sidelines and watch.

When it comes to financial investments, diversification is essential. Andrew took this gamble in order to better diversify his portfolio. His investment was already well diversified in one way: He bought options on an index of stocks rather than any one stock. That's the smart, if boring, thing to do. Jim Cramer wouldn't have much to shout about if the average investor was like Andrew and just bought stock market indices. Andrew knows that his job is to be a lawyer, not a stock picker. In law school, he didn't have time to figure out which stocks would outperform and which ones wouldn't. Even if he did have time, he is smart enough to know that he isn't likely to beat the average.

Later in life, Andrew can do even more in terms of diversifying his portfolio. He can add foreign stocks, commodities, and real estate to the mix. But for now, spreading his investments across the 500 stocks in the Standard and Poor's index is a good start.

Total Dollar Years

To see how Andrew's investing strategy reduces his risk, we calculate a new measure of stock market exposure, something we call "Total Dollar Years." Total dollar years is the sum of dollars you have invested in stock each year. If Andrew were to invest \$5,000 in year 1, \$10,000 in year 2, and \$15,000 in year 3, he would have invested a total of \$30,000 "dollar years." Andrew is much better diversified against temporal fluctuations in the stock market when he invests the total dollar years more evenly across time, here \$10,000 in each of three years. The total dollar years are the same, but they are better spread out. Of course, Andrew didn't have \$10,000 to invest in year 1 and that's why it made sense for him to buy the LEAP.

You should think of every year of your life as a distinct investment opportunity. Diversification tells us that you shouldn't put 80 percent of your stock investment into just 10 stocks. You do better to spread your bets across a broader portfolio.

The same idea of equal allocation applies to investment periods. People make the mistake of putting 80 percent of their stock investments in just ten years. This can have disastrous consequences if those ten years happen to end badly. In fact, as we write this in the summer of 2009, the S&P stands at its 1997 level. People close to retirement who invested the bulk of their stock money in this lost decade will not have done well. You are better off spreading your stock investments across several decades. Keep the total dollar years the same, but spread them out over more years.

Use Leverage

The naysayers respond that this kind of temporal diversification just isn't possible because young people don't have more money to invest. You can't invest what you don't have. But that's flat wrong. When it comes to housing, people invest what they don't have all the time. You save for a down payment, and then go out and buy a house or condo worth ten times as

much by borrowing the difference. Lenders are willing to lend the money because the house serves as collateral.

The same holds true for stock investments. You can take what you've saved and combine that with borrowed money to purchase more stock than your total savings. Federal law limits the amount you can borrow—it can't be more than you put up. So if you have \$4,000 to invest, you can borrow another \$4,000 from your stockbroker in order to buy \$8,000 of stock. This is called buying stock on “margin.”

Buying stock on margin increases your exposure and hence your short-term risk. It's called a “leveraged” position because, like Archimedes' lever, a small movement in the market can produce a large movement in portfolio value.³ If you buy a \$500,000 house with a \$450,000 mortgage and a \$50,000 down payment, then you are leveraged 10:1. A 10 percent increase in the house value translates into a 100 percent increase in your equity (\$550,000 – \$450,000 mortgage = \$100,000). Of course, if housing prices fall 10 percent, your portfolio would have lost all of its value. The more leverage, the more short-term risk.

The same leveraged effect applies to stock bought on margin. If you buy \$8,000 of stock using \$4,000 of margin and the stocks go up 10 percent, to \$8,800, then you've made 20 percent on your \$4,000 investment. You get twice the return on the market, whether it goes up or it goes down.

Our point is not to encourage risk taking—quite the contrary. Buying stock on margin when you're young reduces long-term risk because it allows you to do a better job evening out your otherwise lopsided exposure to the market. If you have \$4,000 of market exposure when you're twenty-five and \$200,000 when you're sixty-five, it would be better to bring the initial exposure up to \$8,000 and reduce the final exposure to \$196,000.

While buying stock on margin helps in terms of diversification, it creates some other problems. If stocks fall enough, you can be asked to put up more collateral. If you don't meet this margin call, then your portfolio will be liquidated, whether you like it or not. Since you didn't have more money to invest in the first place, you probably won't have the money to put up in the event of a margin call. A second issue is that many (but not

all) brokers charge high interest rates for a margin loan. The cost of this interest can more than offset all the gains from diversification. From our perspective, buying stocks on margin has too many drawbacks to make it an effective tool.

Fortunately, there's more than one way to skin a cat. You can get effectively the same amount of leverage through buying a call option. The advantage of the option is that there aren't any margin calls. Whether the market goes up or down, you won't be called on to put in more money. A second advantage is that call options allow you to double your exposure to the market at a very low cost. In Chapter 8, we show that in recent years the implied interest rate associated with long-term call options that provide 2:1 leverage was only 4 percent.

This is why Andrew invested in LEAPs as his way of better diversifying his portfolio. Andrew spent \$4,770 to get an option to buy the SPDR for \$45. If stocks go up 10 percent from where they were when he started (from 92 to 101.2), Andrew will make \$850 on his \$4,770 investment, which is an 18 percent return. If stocks fall by 10 percent, then he will lose \$990, or 21 percent.* He has the same leverage as if he bought stocks using a margin loan, but he doesn't have to worry about getting a margin call or paying usurious interest.

Proposing leverage often sets off red flags. Recent events highlight the issue. Young investors who followed our advice would have lost 64 percent of their savings in 2008. What does that say about our strategy?

While losing 64 percent of your investments is never fun, it is much better to do so when you're twenty-five than when you are sixty-five. This is true for two reasons. First, you have a lot more time to adjust in response. Over the next forty years, you can work harder, save more, or consume less. Second, even following our advice, you'll have a lot less money in the market when you are twenty-five compared to when you are sixty-five. If Andrew ends up losing 64 percent of his initial investment, he'll be

*The reason why the up and the down aren't completely symmetrical is that the LEAP price includes some implicit interest on the part of the shares Andrew hasn't yet purchased. These calculations are provided in Chapter 7.

down a little over \$3,000. That's painful, but not crippling. If he loses 64 percent of his nest egg when he's sixty-five, that's a major problem.

Remember that our advice isn't just for twenty-five-year-olds today. There is the corresponding advice for sixty-five-year-olds: Namely, buy a little less stock. If we had written this book forty years ago and an older version of Andrew had been following our advice all along, then he would have been less invested in the market in 2008 and thus lost less. We've done the simulations and found that he would have come out 7 percent ahead overall compared to following the traditional approach.*

Because we propose investing more when young and less when old, you'll obviously come out ahead if the market performs better when you're young and worse when you're old. And you'll do worse if the market does poorly when you're young and booms when you are near retirement. But that's not a fair test for evaluating our strategy. Our goal is to reduce risk. That means giving up some of the highs in return for missing some of the lows. We can't eliminate all the risk, but by diversifying time we can reduce it substantially.

Of course, Andrew got off to a bad start. January 2009 was the worst January in the history of the Dow Jones Industrial Average, all the way back to 1896.⁴ As of May 2009, he was back in the black. There will be more ups and downs along the way. We can't tell you how things will turn out for Andrew. That will take another forty years. But we don't ask you to take our word on faith. In Chapter 3, we tell you what would have happened over the last 138 years if you had followed our advice, including what would have happened to those who just retired at the end of 2008.

(Dis)counting Your Chickens Before They Hatch

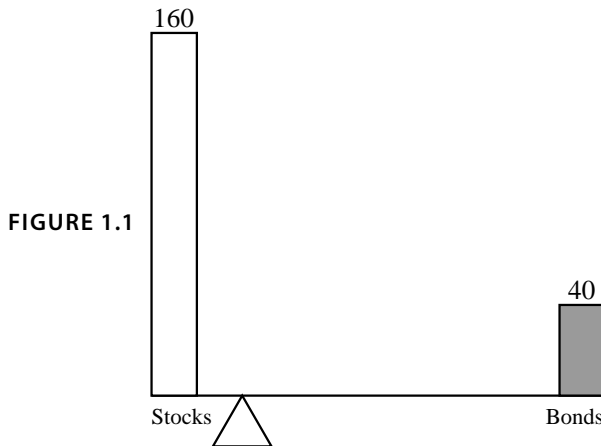
The diversifying benefits of leverage are possible whenever you know you're going to have a substantial amount of savings in the future. Gener-

*The traditional approach landed at \$635,000, while our lifecycle strategy ended up at \$679,000. Both were down significantly from 2007, but our approach fell less.

ally speaking, this is due to a rising income. But there are some other ways this might happen.

This is the second book we've written together. In 2000, we signed a contract to write *Why Not?*, a book on creativity for Harvard Business School Press. We knew we were going to get a sizable advance in a year's time and that we were going to invest almost all that money in the stock market as soon as we got it. The question we failed to ask at the time was: Why wait two years before exposing any of that money to the benefits of market risk? One answer is that we didn't have the money in hand to invest.

But that's a poor argument. To explain why, we'll use some round numbers for the sake of illustration. Let's say that we each started with \$160,000 invested in stocks and \$40,000 invested in bonds. Our desired allocation prior to getting the book advance was to be 80 percent in equities, 20 percent in bonds, as illustrated in Figure 1.1.

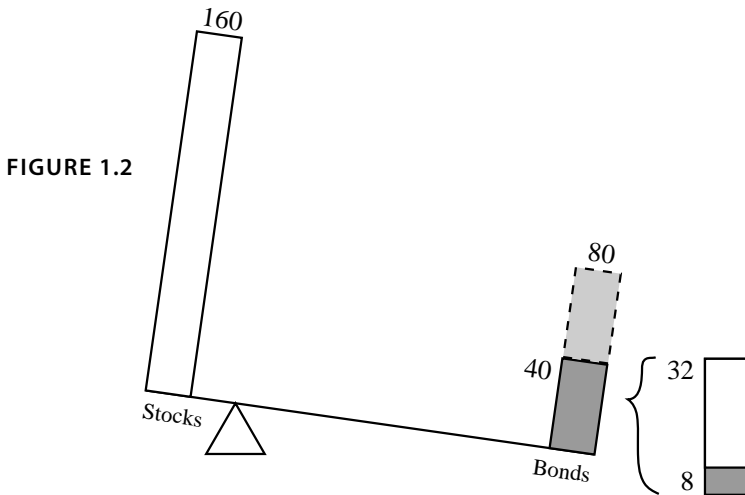


Sticking to round numbers, our book advance was roughly \$150,000, which translated to about \$45,000 each after taxes. We each planned to spend \$5,000 of that amount and put the other \$40,000 into our retirement savings. (Okay, we're not much fun now, but we'll have enough money saved to still have some fun when we're old.)

Remember that our goal was to be 80 percent invested in stocks, which implies that when we got the advance we'd put \$40,000 into our retirement account, of which \$32,000 would go into stocks and \$8,000 into bonds.

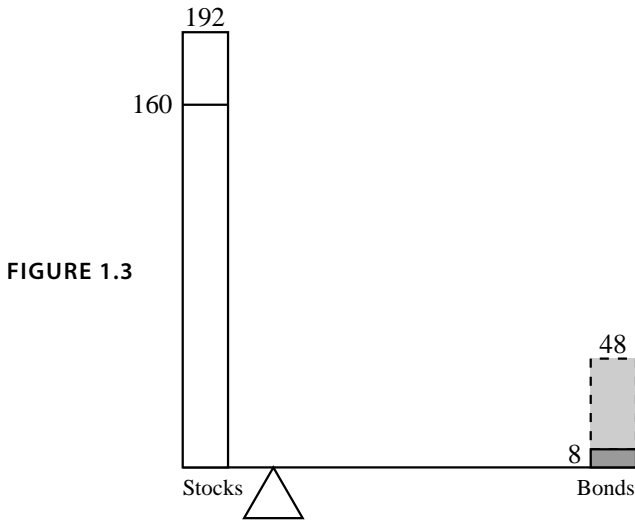
That's all fine for the future, but why wait? There was nothing stopping us from taking the \$40,000 we already had in bonds and putting \$32,000 into stocks right away. If you are thinking that was increasing our allocation to stocks, you have it backwards. Doing this was required to keep our allocation 80/20.

Say we did nothing. Then our portfolio would become tilted more toward bonds, as in Figure 1.2 below. We had the \$40,000 in regular bonds, plus the book advance. The promissory note from our publisher wasn't exactly like a regular Treasury bill. (Although given the size of Harvard's endowment, we're not sure which is the worse credit risk.) And we'd actually have to write the book to get the check. We were pretty confident, though, that we would get the book done.



To rebalance the scales, all we had to do was move \$32,000 from bonds over to stocks as in Figure 1.3. Although it may then look as if we only had \$8,000 invested in bonds, the forthcoming advance checks are much like a bond. We knew the amount and when we'd get it, and we could figure out how much would be left over after tax. Thus our true bond holdings were really the \$8,000 in government bonds plus the \$40,000 note from our book.

To do this calculation right, there's one more step to take. Since we wouldn't get the bulk of the money for a year, we should discount the



\$40,000 to take this into account. We could get \$40,000 in a year by buying a \$38,000 zero-coupon bond. That implies that the true incremental amount we have in bonds isn't \$40,000, but only \$38,000. We should have treated the \$40,000 in a year as like \$38,000 today and chosen to invest 80 percent of that amount, or \$30,400.

While a book advance might seem like a special or esoteric situation, there is a general lesson here that is the key intuition underlying our whole strategy. Your future salary is a lot like our book advance. You can predict, more or less, how much you will make in the future and what you will do with that money. Our main point is that you should figure out how you would invest that money if you had it today and then try to achieve that outcome. You won't be able to do this perfectly, but getting close counts.

There are two steps here. The big step is to realize that (if you are like most people) your future salary is like a bond and therefore you are probably much more heavily weighted in bonds than you realize. The second step is to discount that bond back to today. Because that money comes in the future, it isn't quite as valuable as if you had it today.

We were all taught as children not to count our chickens before they hatch. And we agree. But you should discount your chickens before they hatch. Instead of ignoring your future retirement savings, you should calculate the present value of expected saving contributions and start investing

some of those contributions in the stock market today. The “present value” of future dollars is the amount of cash in hand today that would make you just as happy. The present value of a future dollar is always less than a dollar, but it isn’t zero—and your optimal investment today should take it into account.

The central mistake that young investors make is to ignore their expected future savings. Earlier we estimated that the present value of Andrew’s future savings was over \$500,000. But even if Andrew is less confident—he is taking a year off to volunteer in China before starting at a law firm—it is hard to envision a world where the present value of his savings wouldn’t be at least \$200,000. To avoid bunching all his investments into his fifties and sixties, Andrew needs to expose some of that present value to the market now.

Discounting Your Income

Think of it this way. If you are thirty, earning a steady \$100,000 per year, and putting aside \$5,000 then, mathematically, it is as if you have \$120,000 invested in bonds. Your future savings contributions of \$5,000 a year over the next thirty-six years are worth \$120,000 today. Thus if you have \$50,000 in current savings and 90 percent of that invested in stocks, it isn’t the case that you have 90 percent of your assets in stocks. A more accurate picture is that you have \$45,000 in stocks and \$125,000 in bonds (\$5,000 from current savings plus \$120,000 future savings). Only 26 percent of your true total savings portfolio is in stocks. Investing a little more in stocks when young isn’t as risky as you may have thought.

Actually, the percent in stock is far lower than 26 percent. If you earn \$100,000, you can expect that Social Security will replace about 25 percent of your income upon retirement. That replacement income is even more valuable because it is indexed to inflation. To buy an annuity that provides the same terms would cost roughly \$500,000 at the time of your retirement, or about \$190,000 today. Thus your total bond holdings are closer to \$315,000. That means your \$45,000 in stocks is only 13 percent of your portfolio. Here you were thinking that 90 percent was a high

percentage to put in the market. But when you think of how much of your wealth is already in bonds, even putting 200 percent in stocks only brings you up to 28 percent overall.