



TIME & MONEY: PARTNERS IN YOUR PROSPERITY

If you understand how time affects the value of your money, you can make decisions about what to invest in and what to buy, in order to enhance that value.

What can work against you over time is *inflation*. What can work for you is *appreciation*.

What works both for and against you is *interest*. For instance, when you're earning interest (or dividends from bonds or preferred stock), it adds to the value of your money. But when you're paying interest (on, say, mortgages and car loans), it can erode your money's value.

What We're Talking About

These are the basic terms to keep clear when thinking about the time-value of money and how to use it in your favor.

Compound Interest:

The interest earned not only on principal but also on the interest earned in previous periods.

Future Value:

What the money you have now will actually be worth if you leave it and add the interest that will compound at a given rate.

Inflation:

Continuing increase in prices in an economy, usually associated with a decrease in purchasing power (which is how much you can buy with a given amount of money). Something to keep in mind: The average inflation rate from 1926 through 1997 has been calculated at 3.1%.

Interest:

The charge for use of money: what financial institutions like banks and certain kinds of stock pay you for letting them use your money and what you pay them on loans when they let you use their money.

Opportunity Cost:

The benefits you forego by choosing one alternative over another; what else you could have done with the money you decided to invest.

Present Value:

What the money you expect to receive later would actually be worth if you had it now.

Time-Value of Money:

A given amount of money today is worth more than the same amount in the future, despite inflation, since it can earn interest or otherwise appreciate in that amount of time.

How Time Affects Earnings

The interest rate does make a difference: At 4% it will take almost 20 years to double your money; at 5% it will take almost 15 years; at 8% it will take just less than 10 years.

Earnings over Time on a \$1,000 Investment

Year	Interest Rates									
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
5	\$51	\$104	\$159	\$217	\$276	\$338	\$402	\$469	\$539	\$611
10	\$105	\$218	\$355	\$480	\$628	\$719	\$967	\$1,158	\$1,367	\$1,594
15	\$161	\$346	\$558	\$801	\$1,078	\$1,396	\$1,759	\$2,172	\$2,642	\$3,177
20	\$220	\$486	\$806	\$1,191	\$1,653	\$2,207	\$2,870	\$3,661	\$4,604	\$5,727

Warning: These rates are what you earn before inflation. If you have an investment that's earning an 8% rate but inflation runs at an average of 2%, you'll get the results shown in the 6% column. (We won't even attempt to talk about taxes here, though it's wise to keep them in mind when you're investing.)

Going Up

Here's how compound interest works to get you those earnings:

End of Year	Account Balance	Interest Rate	Interest Earned	Balance
1	\$1,000	10%	\$100	\$1,100
2	\$1,100	10%	\$110	\$1,210
3	\$1,210	10%	\$121	\$1,331
4	\$1,333.1	10%	\$133.10	\$1,474.10

You'll earn even more if the bank, as most banks do, compounds the interest more often than once a year. For instance, in this example, if the bank compounds quarterly, at the end of the first year the interest earned will be \$103.80—3.8% more than if the interest is calculated just once a year. So your effective interest rate is really 10.38%; if the bank compounds monthly, the effective rate will be even greater—10.47%.

Going Down

Unfortunately, the value of your money can also go down if inflation and market rates of return are rising. Here's roughly what your \$1,000 might be worth at different market rates if you just stuffed it into your mattress and then went shopping with it in a year or two:

Year	Market Rate		
	3.0%	6.0%	9.0%
1	\$971	\$943	\$917
2	\$943	\$890	\$841



Government Bonds: The Simplest Time-Value Play

Why can you buy U.S. government savings bonds at \$25 and cash them in for the face value of \$50? It's because the difference is what they're earning as the interest compounds over time. Let's look at how the government sells paper EE/E bonds. (You can also set up an account and buy bonds electronically through TreasuryDirect; the differences between electronic and paper bonds are minimal.)

Denominations:	You can buy paper bonds at face values of \$50, \$75, \$100, \$200, \$500, \$1,000, \$5,000 and \$10,000.
Interest rate:	Variable; market-based. For instance, in mid-2004 the rate was 2.84%.
Minimum term of ownership:	1 year
How long they'll earn interest:	30 years
Early redemption penalties:	If you redeem a bond you've held less than 5 years, you forfeit the interest earned in the 3 months before you redeem. If you redeem after 5 years, there's no penalty.

The government also sells I bonds, which have similar terms but are bought at face value instead of being discounted 50% like E bonds, and earn a guaranteed rate of return; in mid-2004 the rate was pegged at 3.39%.

Many people like to have some Treasury bonds just because they're very safe; with the U.S. government standing behind them, the risk of loss is obviously very low. But what do the EE/E terms tell you about the time-value of money?

- The market-based rate of return means the government will try to keep your return at least slightly ahead of inflation, so you will earn something on this investment, though not as much as you might with others.
- Without being able to predict exactly what inflation will be (though it knows there will be some), the government is hedging its bets a bit. The penalty for early redemption means that the government will at least cover the costs of administering the bond program even if it doesn't make money on the spread between the interest it's paying and what it's earning in other ways.

Options: The Extreme Time-Value Play

The whole basis for valuing options is time-value: options buyers pay the sellers what is in fact a time-value premium. The time-value component of the price is a function of the time remaining until the option expires and how close the option strike price (the price at which the buyer can exercise the option) is to the actual price on the market. The closer the two prices, the higher the time-value, because when an option is at-the-money (when strike price and actual price are the same), the potential for intrinsic value to rise is the greatest. The more time before the option expires, the greater the possibility for increased value.

Pay-Back Time

How can you use the time-value of money to work for you when you're the one doing the borrowing?

A typical mortgage shows how making biweekly rather than monthly payments—in effect, paying a little earlier—can save you money over the long run:

Loan Principal:	\$100,000
Term:	30 years
Annual Interest Rate:	8.75%
Monthly Payment:	\$786.70
Average Interest Paid Monthly:	\$508.92
Biweekly Payment:	\$393.35
Average Interest Paid Biweekly:	\$159.79
Total Interest Paid on Monthly Payments:	\$183,212.15
Total Interest Paid on Biweekly Payments:	\$124,959.36
Interest Saved with Biweekly Payments:	\$58,252.79

With the biweekly payment, you're actually paying down the equivalent of an extra monthly payment every year, so the principal on your loan is going down faster.



Investing in Your Child's Education

According to the Census Bureau, the average income in 2000 for an employee with a bachelor's degree was \$45,678, almost twice the \$24,572 average earned by someone with just a high school diploma. Over your child's lifetime, the difference is worth almost a million dollars.

The costs that are projected for a college education 10 years from now are pretty frightening. The federal government has been helpful by adding Section 529 to the Internal Revenue Code that lets you set up tax-benefited savings plans, but you can't get the benefits if you don't start the savings. Here are some things to keep in mind:

FACT: Estimated cost of 4 years at a public university in 2014: **\$97,118**
But you may not need to save the full amount!

The one-third rule of thumb:

- Save one-third of the expected college costs ahead of time.
- Pay one-third out of current income and financial aid during the college years.
- Borrow one-third (you or the student) and pay it back after college.

However, let's assume you want to save the whole amount your preteen will need in about 10 years. That's where the time-value of money comes into play. A 529 account usually pays 6%. The chart below shows a possible savings plan to get to \$97,118 by 2014.

Already Saved	Future Value at 6%	Monthly Savings
0	0	\$460
\$10,000	\$17,000	\$375
\$20,000	\$35,800	\$290

Working Your Way Toward Retirement

Retirement planning has been called "the real midlife crisis." The time-value of money will affect how prepared you are when retirement finally arrives. But before you do any financial calculations, you have to answer some life style questions:

- What big-ticket expenses lie ahead? Kids to put through college? Parents with health problems?
- How much insurance do you have for life, health and home? Will you need the same 10 years from now?
- When do you plan to retire? When will your spouse retire? How many years away is that?
- What do you plan to do during retirement? Will it bring in income? How sure are you that you'll be able to do it? (Note: 25% of people who reach retirement age have health problems that prevent them from working.)
- Do you plan to stay in the same house? The same city? If you move, do you want a bigger or a smaller place?
- How much income will you need to live on comfortably, without a drastic change in life style?

Then you need to work out what you have and what you'll need. Keep in mind that the average life expectancy figures, (in the 70s), are just averages. Many people live longer, so it's wise to plan for at least 25 to 30 years of retirement.

[\(Retirement Savings Worksheet on next page\)](#)



Retirement Savings Worksheet

Use the following worksheet to determine what resources you'll need to retire.

Social Security	\$
<i>plus</i> Pension	\$
<i>plus</i> Private Retirement Plan (IRA, etc.)	\$
<i>plus</i> Current Investment Income	\$
Available Retirement Income	\$
Retirement Income Goal	\$
<i>minus</i> Available Retirement Income	\$
Future Income Needed	\$
Future Income Needed divided by High Return (0.08):	\$
Low Amount to be Saved	\$
Future Income Needed divided by Low Return (0.04):	\$
High Amount to be Saved	\$