

The Time Value of Money



They say, 'Time is money,' but what does one really have to do with the other?

Meet Sheila! She just got her first big bonus. Sheila knows exactly what she wants to do with that money. She's had her eye on a nice convertible for a while now. Yes, Sheila, that's a nice car! Oh, looks like Sheila is a little short. But wait! She has an idea. Sheila is a smart cookie. She knows that if she deposits the money for a year instead of buying the car today, she will earn interest. Then she'll be able to afford the car. Sheila knows that the value of her deposit one year from now will equal the money deposited today plus the interest earned. We call Sheila's money deposited today the present value of money. And the value of Sheila's deposit next year is the future value of money. What connects one to the other? The interest rate, also known as the time value of money. Now, with a little bit of rearranging, we can figure out the future value of Sheila's money with this equation. So in a year, the future value will be \$11,000.

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Well, it's been a year! And there's Sheila, with enough money to buy the car. Sheila really understands the future value of money. Now, I just hope she understands the speed limit!

Now, meet Timmy. He's also gotten his bonus. The money seems to be burning a hole in his pocket. Yes, Timmy, that's a nice car that will surely impress people. Oh! Looks like you're a little short. Maybe you can follow Sheila's example. You see, Timmy, just like Sheila, after the first year, you'll have \$11,000. But Timmy, that is still not enough to buy that fancy car. Why don't you leave the money deposited for another year? Let's see how your deposit will be doing in two years. With a little bit of rearranging, it becomes the value of your money next year, times one plus the interest rate. We can then convert the future value one year from now to the present value times one plus the interest rate. We can even simplify this further by just squaring the value of one plus the interest rate.

Sorry, Timmy, you'll have more money after two years, but you still can't afford the car! I don't know how many more years you'll have to wait, but I can tell you one way we can figure it out. Do you see that little number two in the equation? Any number that you put in there is the number of years that you are waiting, also known as the period. Sure, Timmy, we can see how much you'll have in five years. Let's connect future value and present value across five years. Let's watch the period increase from two to five. After 5 years, you'll have \$16,105.10. Sorry, Timmy, you have to wait a little longer. 10 years? Yeah! Let's see if you'll be able to buy the car then. Not quite. Well, Timmy, it looks like you'll need 26 years to afford this car. You should ask Sheila for a ride to the beach. Maybe a bicycle will suit you better?

I hear the bus is pretty cheap!