

3.6: Perpetuities

A Perpetuity is an annuity that lasts forever. While it is difficult to imagine a situation where an individual could buy a cash flow stream that will pay a fixed amount per year through infinity, perpetuities can be useful tools when dealing with long, constant cash flow streams. Consider someone wanting to fund a scholarship or plan for retirement where she is not sure how long she'll live. A perpetuity can provide a reasonable approximation in either of those situations.

How much would a perpetuity of \$100 be worth assuming a discount rate of 10%? Remember this is \$100 per year forever. It would seem that this would be worth an infinite amount. However, consider what would happen if you had \$1000 today and could put it in the bank to earn 10% interest. You would receive \$100 per year and never touch the principal. You would essentially be buying a \$100 perpetuity (assuming the bank didn't change the interest rate). Therefore, a perpetuity has a finite value. The formula for finding the present value of a perpetuity is as follows:

$$PV = \frac{PMT}{k}$$

Note: When using this formula, always plug in k as a decimal so that 10% is 0.10

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