

## Section 8

Econ 152

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### Introduction

Today we'll consider human capital in the context of a short education decision question.

### Present discounted value (PDV)

In our models, agents usually make decisions over lifetimes using the present discounted value (PDV) of those decisions.

**Def.** The **present discounted value (PDV)**, is the present value ( $t = 0$ ) of a stream of future payments ( $t = 0, 1, 2, 3, \dots$ ). The value of future payments is discounted by the interest rate.

**Note.** The PDV of a payment of value  $V$  in period  $t$  is given by

$$\frac{V}{(1+r)^t}$$

It might be useful to recall (?) the infinite geometric sum:

$$\sum_{t=0}^{\infty} \frac{1}{(1+r)^t} = \frac{1+r}{r}$$

**Example 1.** Say the interest rate is  $r = 0.05$  - in other words, 5% per year.

- Let's say I will receive \$5 next year. I could borrow  $\frac{5}{1+r} = 4.76$  this year, and pay back \$5 next year.
- Let's say I will receive \$4.76 this year. I could save it now and receive  $4.76(1+r) = 5$  next year.

**Exercise 1.** The interest rate is  $r = 0.05$  per year. What are the PDVs of the following?

1. \$5 this year (only).
2. \$5 this year and \$5 next year.
3. \$5 this year and \$10 next year.
4. \$5 this year, \$10 next year, and \$5 the year after that.
5. \$5 every year forever.

## Human capital decisions

**Exercise 2.** Kim and Francis are high school graduates thinking about whether to attend college. There are two time periods. Each person can choose to work in both periods, or go to college in the first period and work in the second. College tuition is \$5,000. Both workers face an interest rate of  $r = 0.1$ .

Kim has higher ability than Francis. Potential per-period earnings with a high school vs. college education for each worker are described in the table below:

	High school	College
Kim	\$20,000	\$40,000
Francis	\$10,000	\$30,000

Compute the present discounted values of income for Kim and Francis with a high school education and a college education. Who will choose to attend college?

**Exercise 3.** Compute the difference in second-period earnings between the worker who attended college and the worker who didn't. This is the observed return to schooling. How does the observed return to schooling compare to the causal return to schooling?