

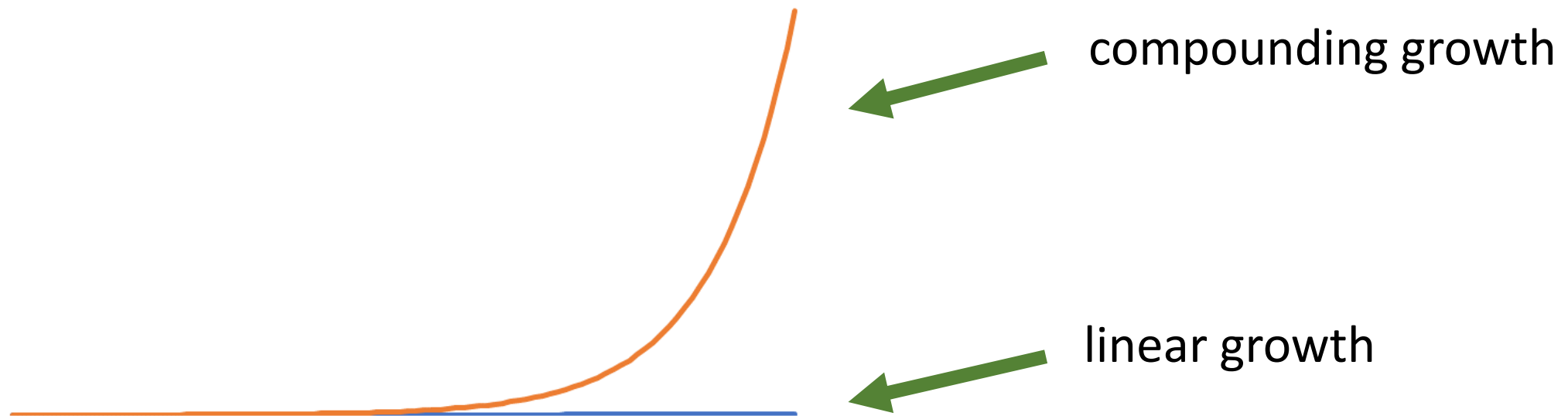
# FINANCIAL METRICS

# Compounding

Reinvest earnings, that then make their own earnings. And so on.

# Compounding

Year	0	1	2	3	4	5
Linear 10%	100	110	120	130	140	150
Compounded	100	110	121	133	146	161



# Compounding

UPS worker Theodore Johnson never earned over \$14,000\* in a year.

He invested 20% of every paycheck over 50 years (in UPS stock).

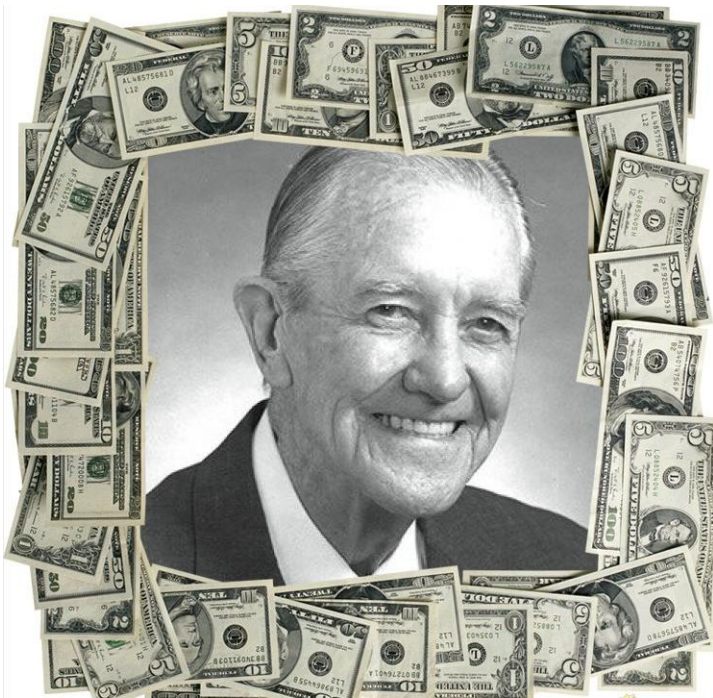
How much did he have at the end?



\* \$14,000 income in 1952 = \$120,000 today

# Compounding

**\$70 MILLION DOLLARS**



# Time value of money

Would you rather have \$100 now or in a year?

\$100 now or \$110 next year (assuming zero risk)?

Why is a dollar worth more to us now than in the future?

General inflation reduces the dollar's future value.

That dollar can be invested, to have more than a dollar in the future.

# Discount rate

We each “discount” future dollars at a different rate.



Bob earns 2%



Jordan Belfort earns 50%

Year	0	1	2	3	4	5
Actual income (\$)	100	100	100	100	100	100
What it's worth to Bob now (\$)	100	98.00	96.20	94.20	92.40	90.60
What it's worth to Jordan now (\$)	100	66.70	44.50	29.60	19.80	13.20

# A problem

A dollar has a different value depending on when it's received.

How can we compare different cash flows?

Option	Year 1	Year 2	Year 3	Year 4	Year 5
A	100	90	95	135	140
B	100	120	125	80	85

Quick! Pick option A or option B!



# Solution: Net Present Value (NPV)

Using the discount rate...

Convert all values to their equivalent current value.

# NPV example 1

Mary can confidently earn 10% elsewhere.

Year	0	1	2	3	4	5
Income (\$)		100	100	100	100	100
Discounted 10% (\$)		90.90	82.60	75.10	68.30	62.10
Net Present Value (\$)	379.08					

Year	0	1	2	3	4	5
Income (\$)		0	0	0	0	500
Discounted 10% (\$)						310.46
Net Present Value (\$)	310.46					

Which option is a better investment?

# NPV example 2

Mary can confidently earn 10% elsewhere.

Year	0	1	2	3	4	5
Income (\$)		100	100	100	100	100
Discounted 10% (\$)		90.90	82.60	75.10	68.30	62.10
Net Present Value (\$)	379.08					

Year	0	1	2	3	4	5
Income (\$)		0	0	0	0	610.50
Discounted 10% (\$)						379.08
Net Present Value (\$)	379.08					

Which option is a better investment?

# Use NPV to compare options?

Probably not...

We can't quickly compare investments with different terms.

# Internal Rate of Return (IRR)

What discount rate will make the net present value equal \$0?

The higher the necessary discount rate, the stronger the investment.

# Internal Rate of Return (IRR)

Back to our previous example...

Year	0	1	2	3	4	5
Income (\$)		100	100	100	100	100
Discounted 10% (\$)		90.90	82.60	75.10	68.30	62.10
Net Present Value (\$)	379.08					

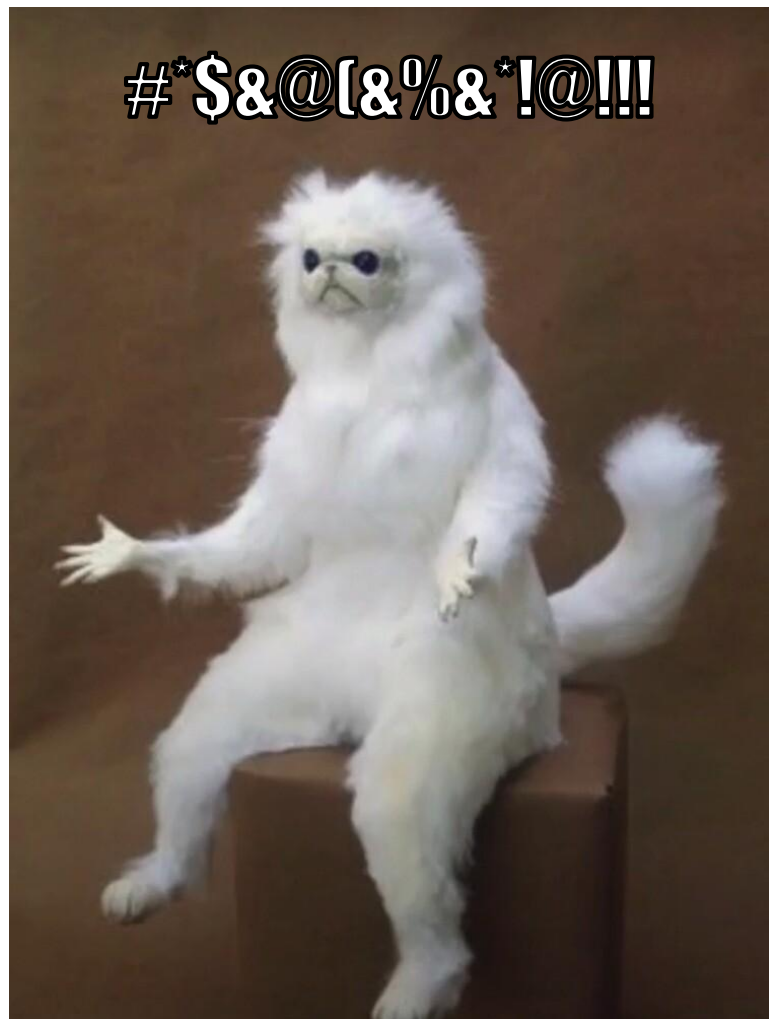
If the upfront *cost* above happened to be \$379.08, what's the IRR?

# Internal Rate of Return (IRR)

Another example...

Year	0	1	2	3	4	5
Income (\$)	-100	25	25	25	25	25
Discounted 8% (\$)	-100	23.15	21.43	19.85	18.38	17.01
Net Present Value (\$)	0					

I hope this is making sense



Year	Cash Flow
0	(\$48,220)
1	\$17,533
2	\$3,109
3	\$3,152
4	\$3,196
5	\$3,240
6	\$3,284
7	\$3,329
8	\$3,375
9	\$3,421
10	\$3,468
11	\$3,515
12	\$3,563
23	\$4,129
24	\$4,184
25	\$4,240
<b>Total</b>	<b>\$53,890</b>

We just need year-by-year profit or loss to calculate the IRR.

18% return!



# Compare the IRR to familiar alternatives

The S&P 500 index's average return over 140 years:

9.2%

From 2010 to 2020:

13.6%

A 30-year treasury bond's return is around 2%.



# A bill reduction is a tax-free investment

Most investment returns are taxable, while bill reductions are tax free.

...Because it's money not spent, and the government can't tax nothing.



Could convert bill savings to its taxable equivalent, to make it comparable with taxable investment returns (the same is done with municipal bonds).



Cash dividend



Bill reduction



Cash dividend



Pre-tax  
bill reduction

# Levelized Cost of Energy (LCOE)

What's the SPS's average cost per kWh over its lifetime?

First, convert future costs to their present value.

This metric isn't usually used in residential sales.

It could be helpful when presenting to facility managers.

# FINANCIAL METRICS

