Financial Fundamentals for Early Career Engineers

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Goals of This Session

- **Expose** you to some very important financial concepts - You will not be an expert, but hopefully you will know what you don't know and seek out further information
- Give you a **sense of urgency** to start early
- Give you (a little) **piece of mind**

Topics

- Saving for Retirement
- Emergency Fund
- Buying/leasing a car
- Debt

= My Opinion/Advice

Topics

- **Saving for Retirement**
- Emergency Fund
- Buying/leasing a car
- Debt

Volunteer 1

- Today, decides to **start** saving $200/mo towards retirement.
- Invests in a mutual fund and earns an annual average of 8.5%/yr.
- 10 years from now, **stops** saving.
- Will **retire** after another 30 years (earning on average 8.5% per year)

Volunteer 2

- Today, buys _____.
- Finances it at $200 per month for the next 10 years.
- **10 years from now**, begins saving $200/mo towards retirement. Also earns 8.5%/yr on investment.
- Continues this investment for the next **30 years** until he retires.

Who invested more of their income?

Volunteer 1

120 months x $200 = **$24,000 invested**

Volunteer 2

360 months x $200 = $**72,000 invested**

Who has more money in 40 years?

Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = final amount

P = initial principal balance

r = interest rate

n = number of times interest applied per time period

t = number of time periods elapsed

Compound Interest Calculator

Determine how much your money can grow using the power of compound interest.

*** DENOTES A REQUIRED FIELD**

Step 1: Initial Investment

Initial Investment *
Amount of money that you have available to invest initially.

Step 2: Contribute

Monthly Contribution
Amount that you plan to add to the principal every month, or a negative number for the amount that you plan to withdraw every month.

Length of Time in Years *
Length of time, in years, that you plan to save.

Step 3: Interest Rate

Estimated Interest Rate *
Your estimated annual interest rate.

Interest rate variance range
Range of interest rates (above and below the rate set above) that you desire to see results for.

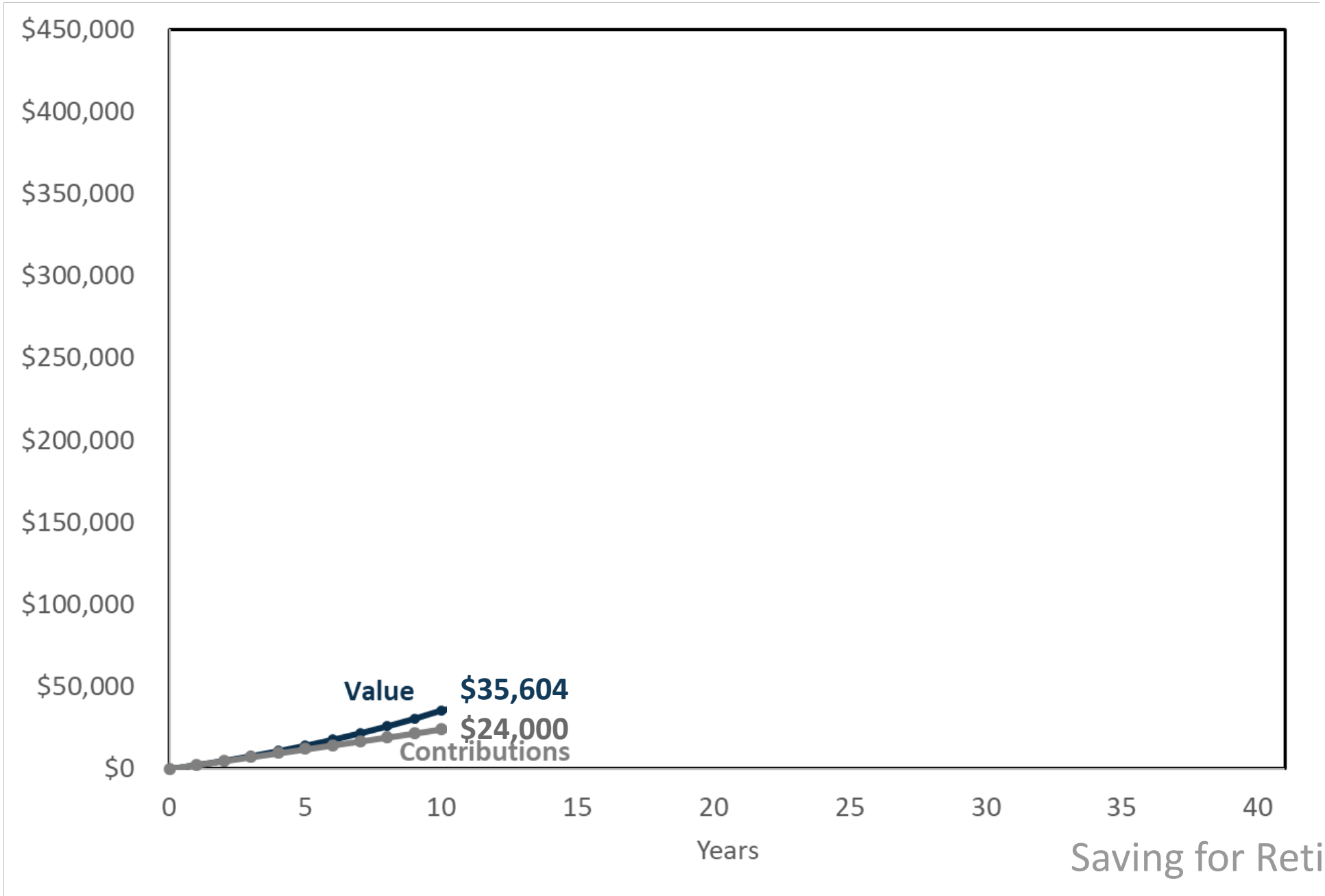
Step 4: Compound It

Compound Frequency
Times per year that interest will be compounded.
Annually

CALCULATE RESET

Investor.gov
U.S. SECURITIES AND EXCHANGE COMMISSION

Volunteer 1


$450,000
$400,000
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Value
$35,604
$24,000
Contributions
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10
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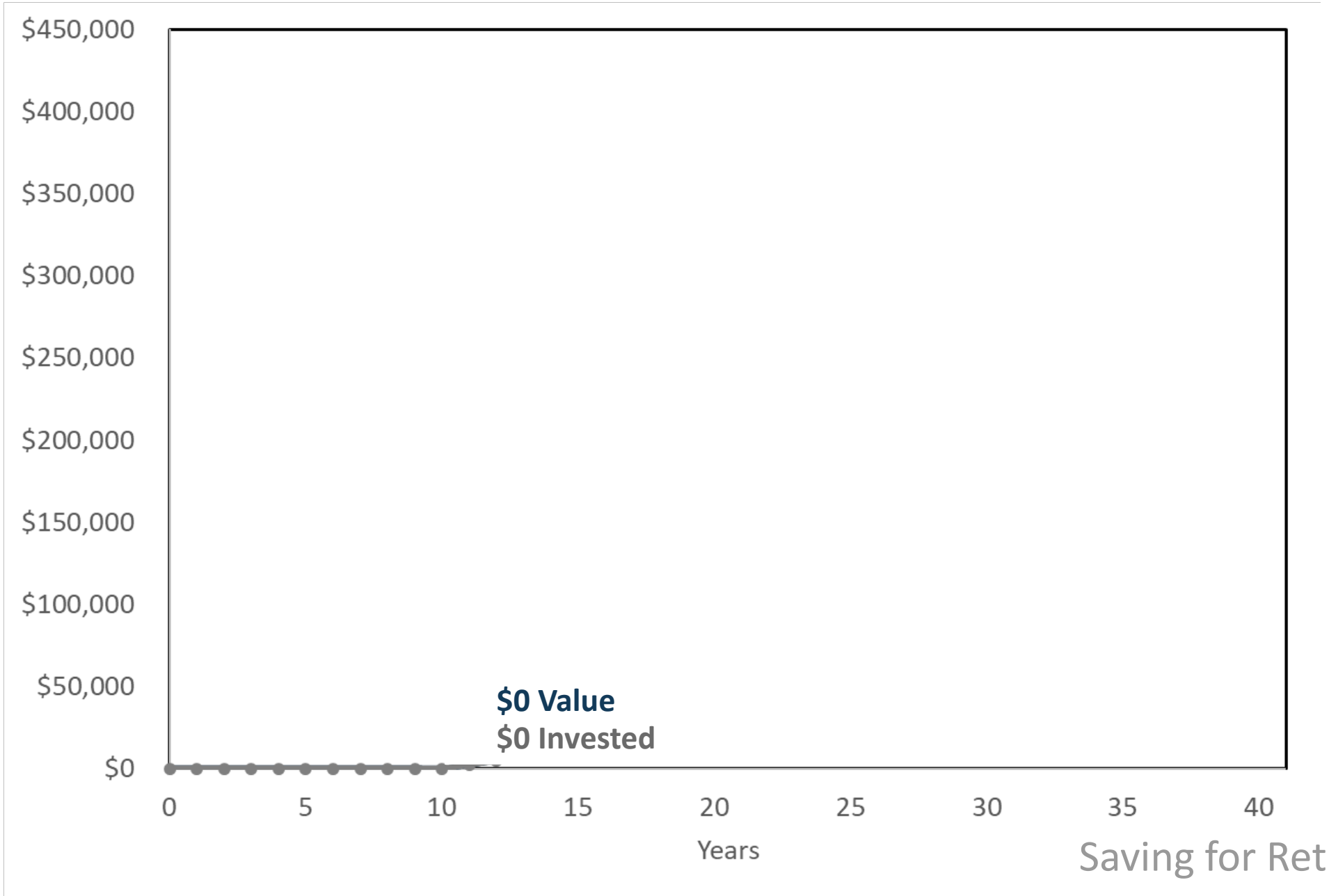
20
25
30
35
40
Years

Volunteer 2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Years
$0 Value
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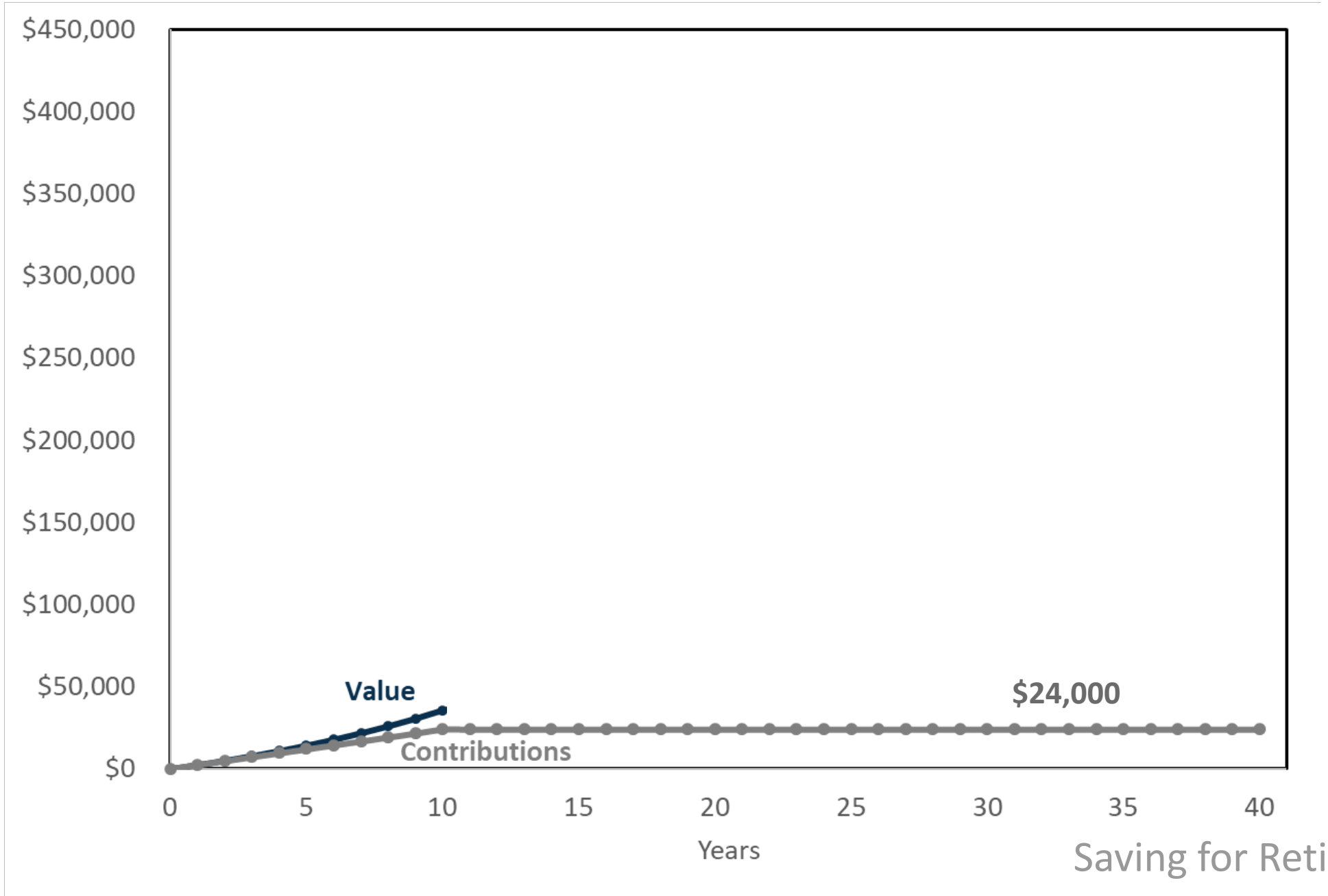
Volunteer 1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Value
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Contributions
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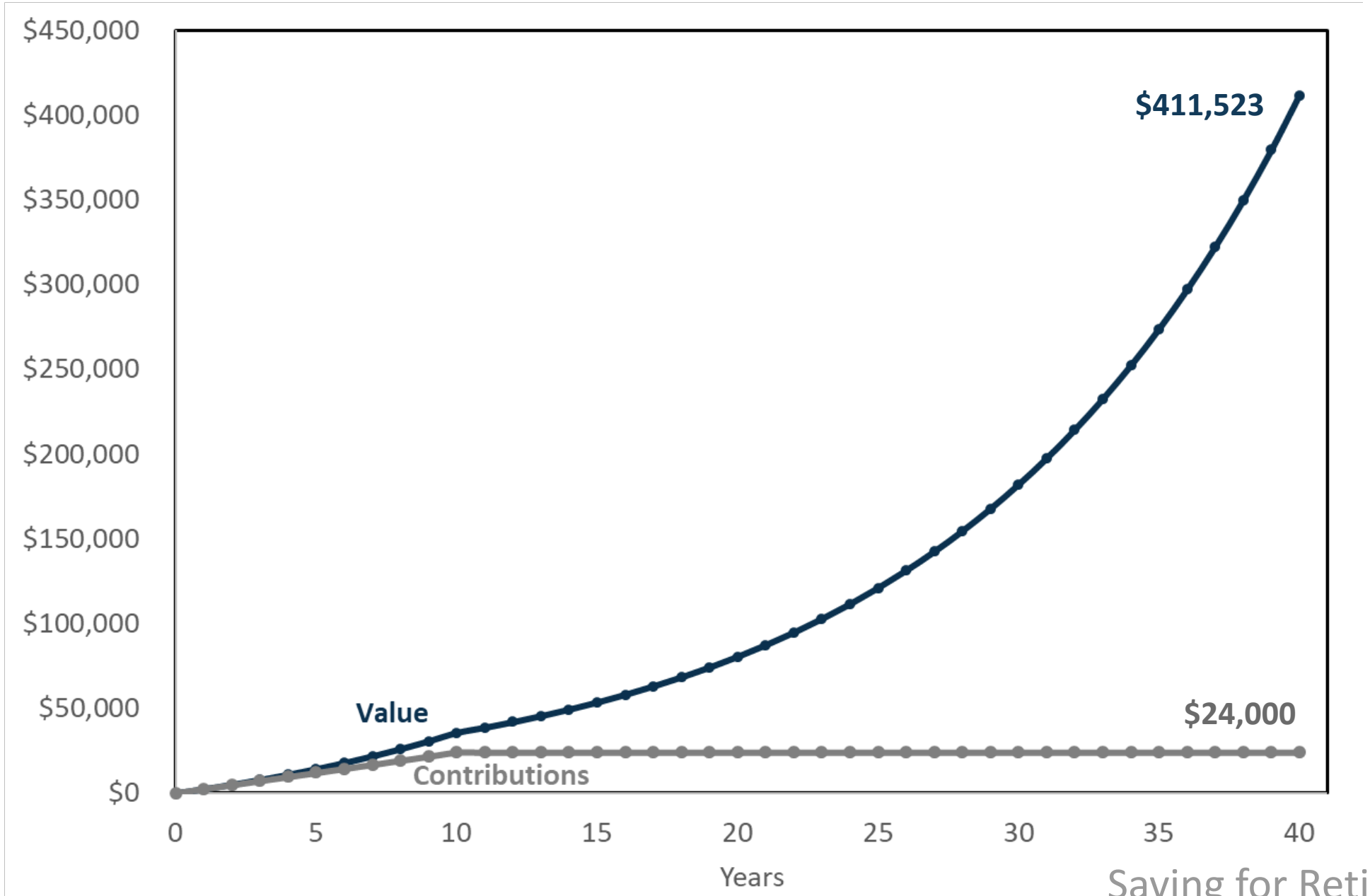
35
40
Years

Volunteer 1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$411,523
$24,000
Value
Contributions
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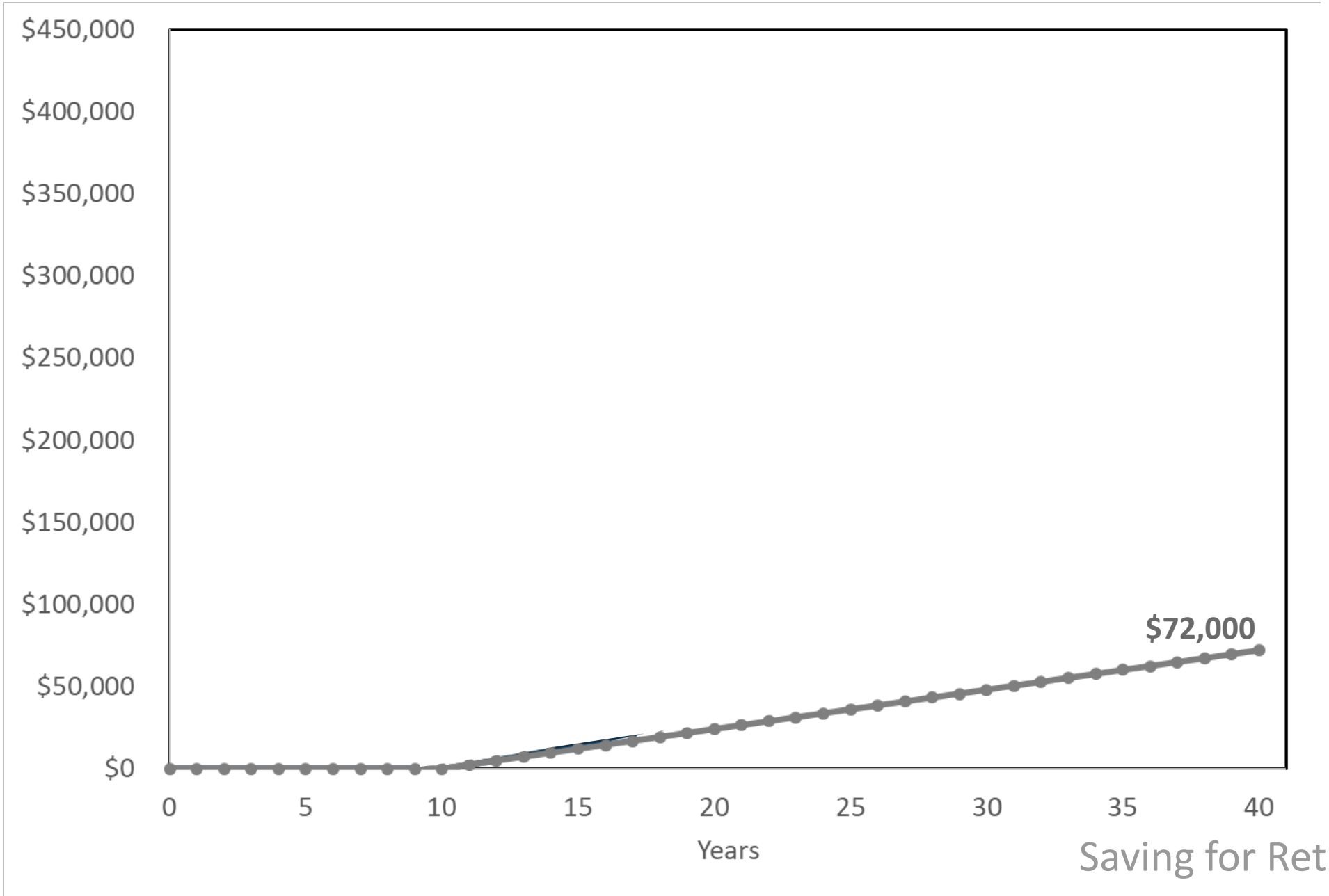
30
35
40
Years

Volunteer 2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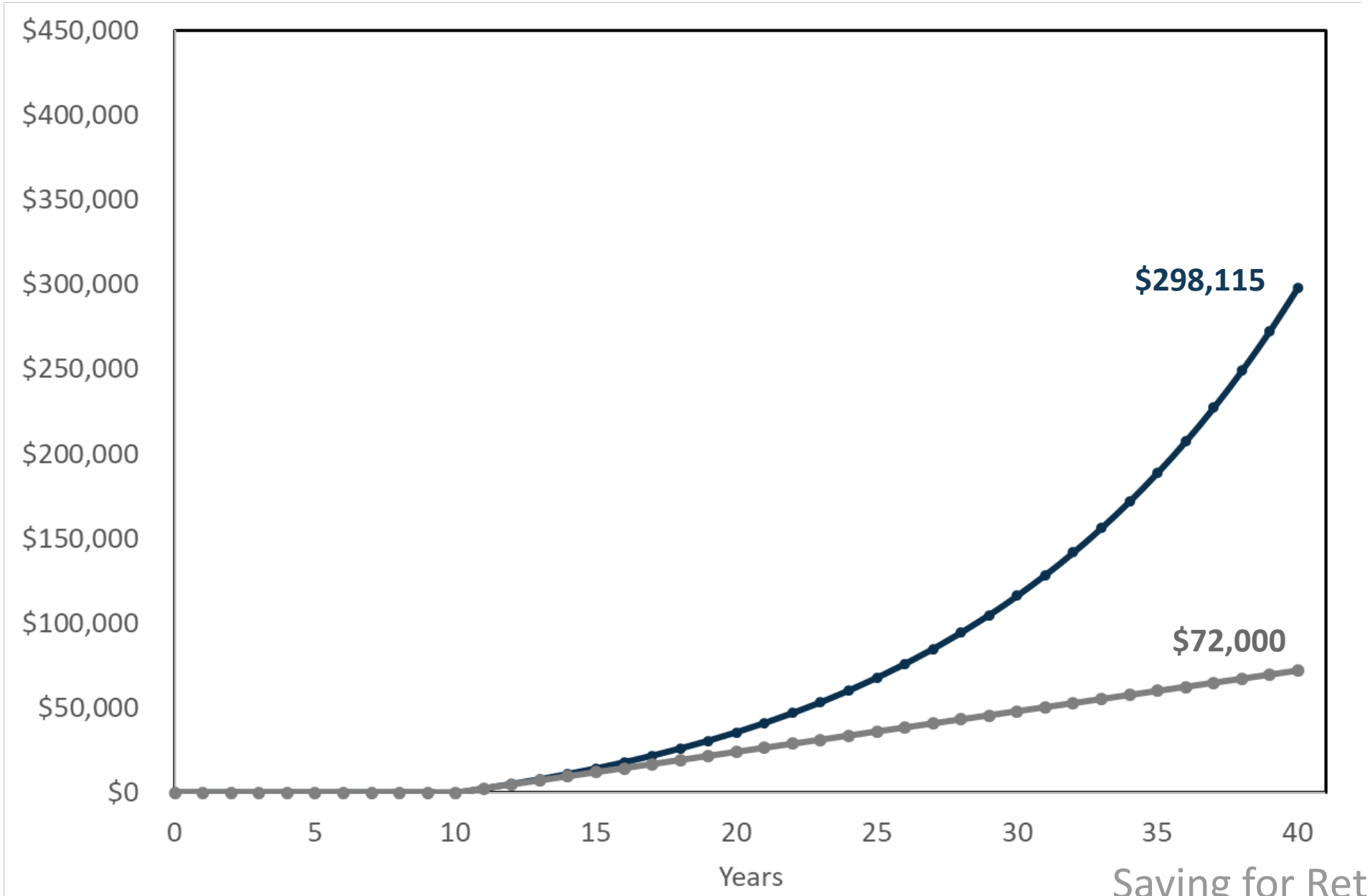
30
35
40
Years
$72,000

Volunteer 2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5
10
15
20
25
30
35
40
Years
$298,115
$72,000

Compounded Interest Example

- *Volunteer 1*!!
- Money was invested for a **longer period of time**. She benefited more from compounded interest.
- At the end of **40 years**:
  - ***Volunteer 1*** has a total of **$411,523** (from $24,000 invested)
  - ***Volunteer 2*** has a total of **$298,115** (from $72,000 invested)
- Every year that you wait to start saving has a big impact!

Q1

Do google search for “Compound interest calculator” to get to:

https://www.investor.gov/financial-tools-calculators/calculators/compound-interest-calculator

A. If you start a retirement accoung at age 25, and invest $100 per month at 5% interest for 40 years until you retire at age 65, how much money would be in the account when you retire?

B. If you instead wait until age 30 to start the retirement account, and still retired at age 65, how much money would be in the account when you retire?

C. By waiting until age 30, you contributed $6000 less to the retirement account… but you ended up with MUCH less money in your account when you retire. Explain why this this happens.

(use annual compounding of interest)

Typical Retirement Goals

- Retire at 65
- Keep the **same** lifestyle – need 70-80% of pre-retirement gross income
- Do not want to worry about having enough money/living to long
- Retirement Income Sources:
  - Social Security – out of your control, only replaces a small portion of typical income
  - Pensions – not very common anymore
  - Employer Sponsored Savings Programs – we will discuss
  - IRAs – we will discuss

How Much to Save Per Year

- Assumptions…

1. You begin collecting Social Security at your Full Retirement Age
2. You do not qualify for Pension Benefits
3. You Retirement Portfolio earns an annual return of at least 7.5%

How Much to Save Per Year

- Pay yourself first!
- The rule of thumb is to save **13-17%** of your income for retirement. This is supposed to get you 80% of your income starting at age 65.
- I really suggest trying to get closer to **17+%**, especially now when you have less expenses and you benefit most from compounding, and you can't control the stock market.

How to Save 15%

- **Most employers help you!!** However, they often require that you at least match them.
- Let's take a sample company, which gives you 5% and matches up to 5%.
  - If you contribute nothing, you save 5% per year (you are wasting free $$$)
  - If you contribute 5%, you save 15% per year (the is the **minimum** you should do)
  - If you contribute 10%, you save 20% per year (this is on the higher end)
- **You are literally giving away free money if you don't fully match your employer!!!**
- There is an IRS cap on your portion of the contribution ($23,000 in 2024), but this does not include your employer – so this is a really important benefit

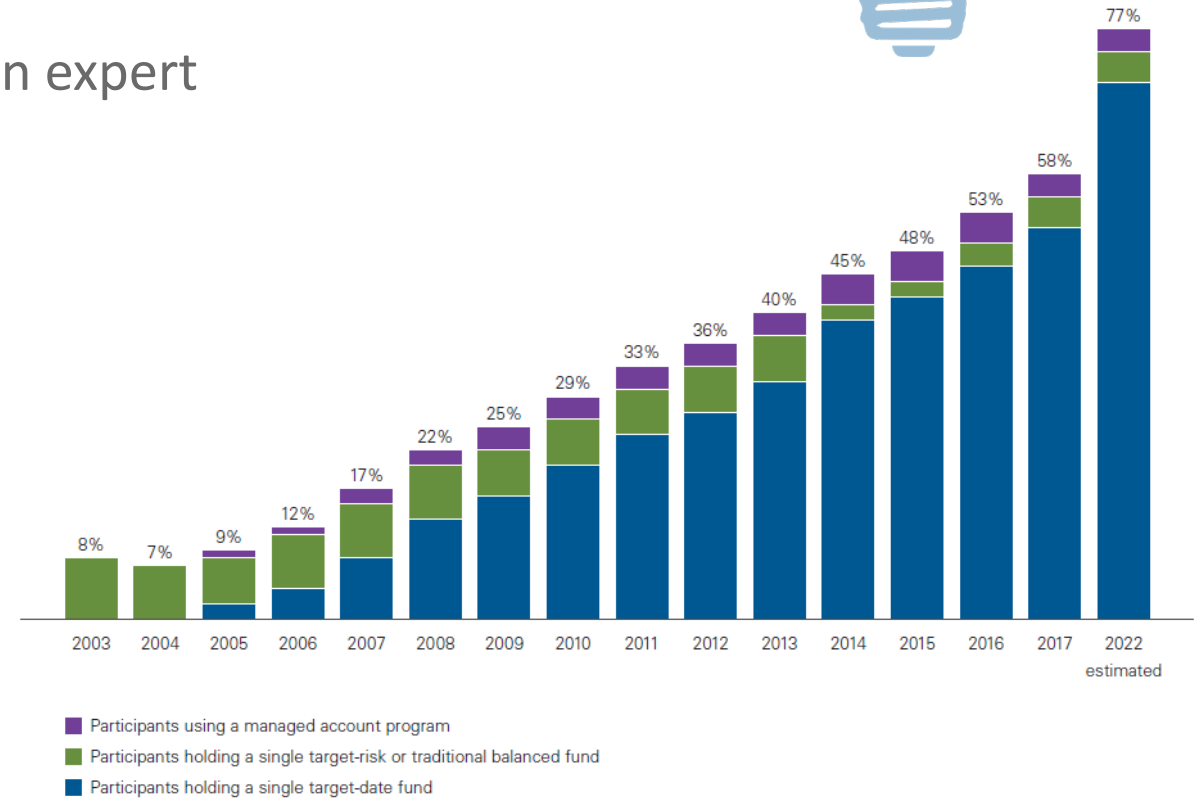
IRAs - Types

- <u>Pay Tax Later</u>
- Traditional IRA (like most employer plans)
- Pay no taxes now, pay when money is dispersed
- Interest grows on the money you would have paid for taxes
- Probably better to focus on when young

- <u>Pay Tax Now</u>
- ROTH IRA
- Pay taxes now, no taxes later
- Helpful to balance a portfolio
- Probably can worry about this a little down the line

Retirement Savings – My Opinion

- Try to start out saving 20% (combined with employer portion). If this is too much, settle somewhere closer to 15%.
- Down the road, either educate yourself or pay an expert
- Don’t check the balance too often
- Balanced Target Date Mutual Funds
  - Available though most providers
  - Usually called something like “Target 2065”
  - All in one plans (rebalancing, management, etc)
  - Low cost, good performance, hands off
  - Great starting point



Q2

The CWRU Plan C retirement benefit includes:

- direct contribution of 6% of your pay
- 50% match of your retirement contribution, up to 4% of your pay

A. How much do you need to contribute to your retirement account in order for your account to grow by 20% of your pay?

B. How much “free money” are you losing if you do not contribute to your retirement account?

Topics

- Saving for Retirement
- **Emergency Fund**
- Buying/leasing a car
- Debt

What are Emergency Funds For?

- An emergency fund is a stash of money set aside to cover the financial surprises life throws your way.
- These **unexpected** events can be stressful and costly.
- Here are some of the top emergencies people face:
  - Job loss
  - Medical or dental emergency
  - Unexpected home repairs
  - Car troubles
  - Unplanned travel expenses

More on Your Emergency Fund

- You should have **at least** 3 to 6 months of **expenses** in your fund
- Keep it in a place like a money market fund – it is **safe** and **accessible**
- Build it up **gradually**, but have a plan to save it up. A good goal might be to build it up over 5 years.
- Will constantly need “topping off” as you make more money (and have more expenses) over your life.

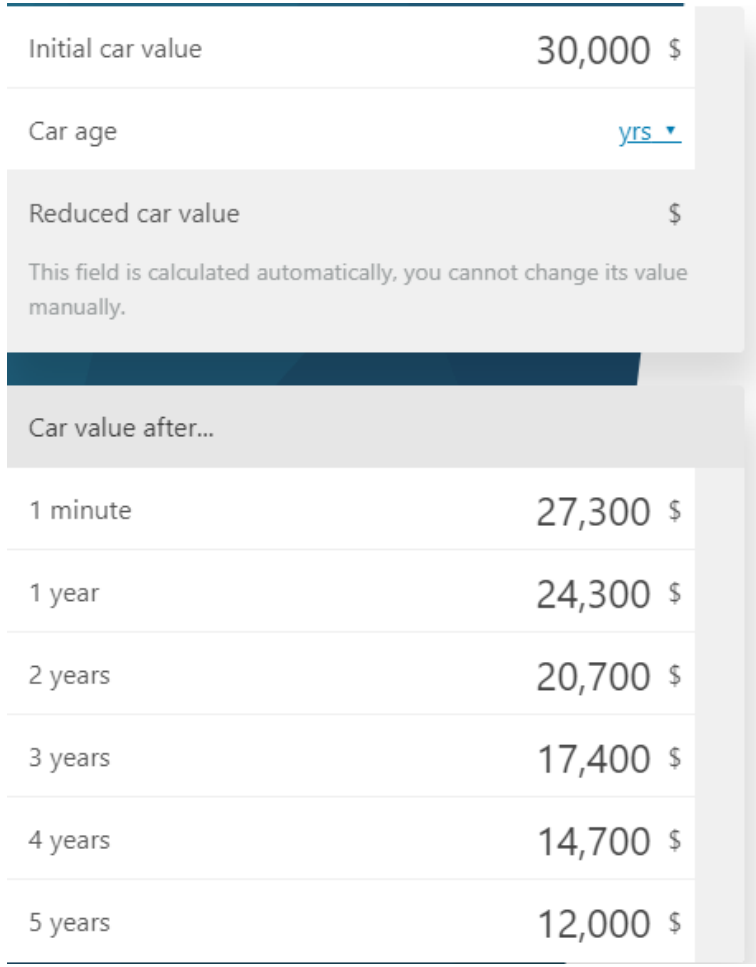
Topics

- Saving for Retirement
- Emergency Fund
- **Buying/leasing a car**
- Debt

Buying a Car

- Get pre-approved for a loan
- Keep it simple at the dealership
- Just say “no” to extras
- Don’t get underwater
- Consider buying used

Depreciation Calculator



Buying vs. Leasing a Car

- Trade-offs to both
- Depends to a large degree on how you use it: how long will you really keep it, how much will you drive it, etc.
- Pay if off faster than it depreciates
- My Suggestion: Calculate the total out of pocket (financing included) for each option over a 3-year period and make an informed decision.
  - There are a lot of online tools that can help with the decision
  - Your best friend is knowledge, and the dealers best friend is confusion

Q3

What does it mean to be “underwater” with your car?

Topics

- Saving for Retirement
- Emergency Fund
- Buying/leasing a car
- **Debt**

Debt Inventory - Sample

Make and maintain a current inventory of your debt

Source	Principal	Interest Rate (APR)	Tax Deductible?	Bankruptcy
Home	$200,000	5.0%	Y	Y
Credit Card	$20,000	20.0%	N	Y
Automobile	$20,000	0.0%	N	Y
Student Loans	$20,000	5.0%	Y	N
…	?	?	?	?

Debt – My Opinion

- Pay off the debt with the highest after-tax cost
- If you have a “tie” between two (2) loans;
  - Pay what cannot be written-off in bankruptcy first,
  - Then what can be written off in bankruptcy.
- If you just received a large inheritance/bonus check
  - Definitely pay high cost debt, like credit cards
  - It may or may not be smart to pay off home/student loans

Debt Inventory - Sample

Which order should I pay off if I inherit money?

	Source	Principal	Interest Rate (APR)	Tax Deductible?	Bankruptcy
③	Home	$200,000	5.0%	Y	Y
①					
④	Automobile	$20,000	0.0%	N	Y
②					
	etc	?	?	?	?

Q4

What type of debt should you always try to pay off first, and why?

Other Topics to Explore

- Insurance – many types
- Credit
- Buying a home

SUMMARY

Summary – first year

- Signup for retirement withdrawals – total 15%
- Make a plan for your emergency fund and start saving 5%/yr
- Get insurance policies for at least car, home, liability, and healthcare
- Start with your employer plans for life insurance and disability
- Inventory your debt and make a prioritized plan

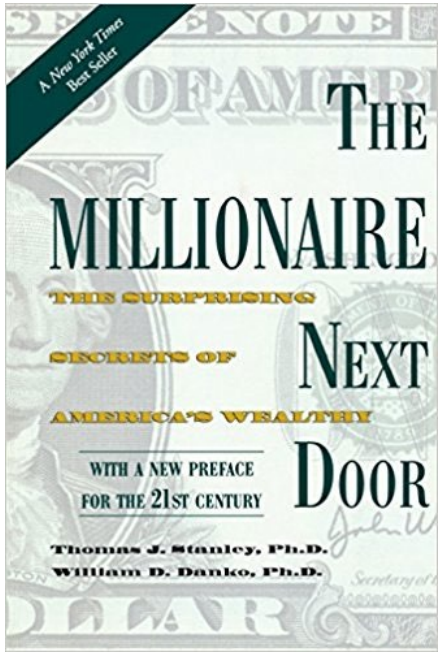
Summary – a few years down the line (and every few years)

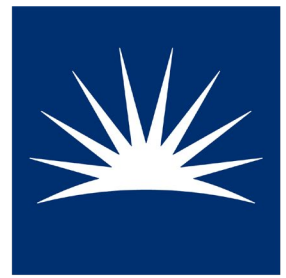
- Check in on your retirement progress, consider increasing to 20%
- Adjust your emergency fund as your expenses grow
- Make and execute a plan for life, disability, and liability insurance
- Make sure you are on track with your debt plan

Acknowledgements & Further Reading

- <u>Acknowledgements</u>
- William Mahnic,
  CWRU Financial 101 Series
- Vanguard.com
- A few mistakes here and there

- <u>Further Reading</u>
- Lots of websites





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