

# Demystifying Diversification

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AAll Houston Chapter

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Merriman Financial Education  
Foundation

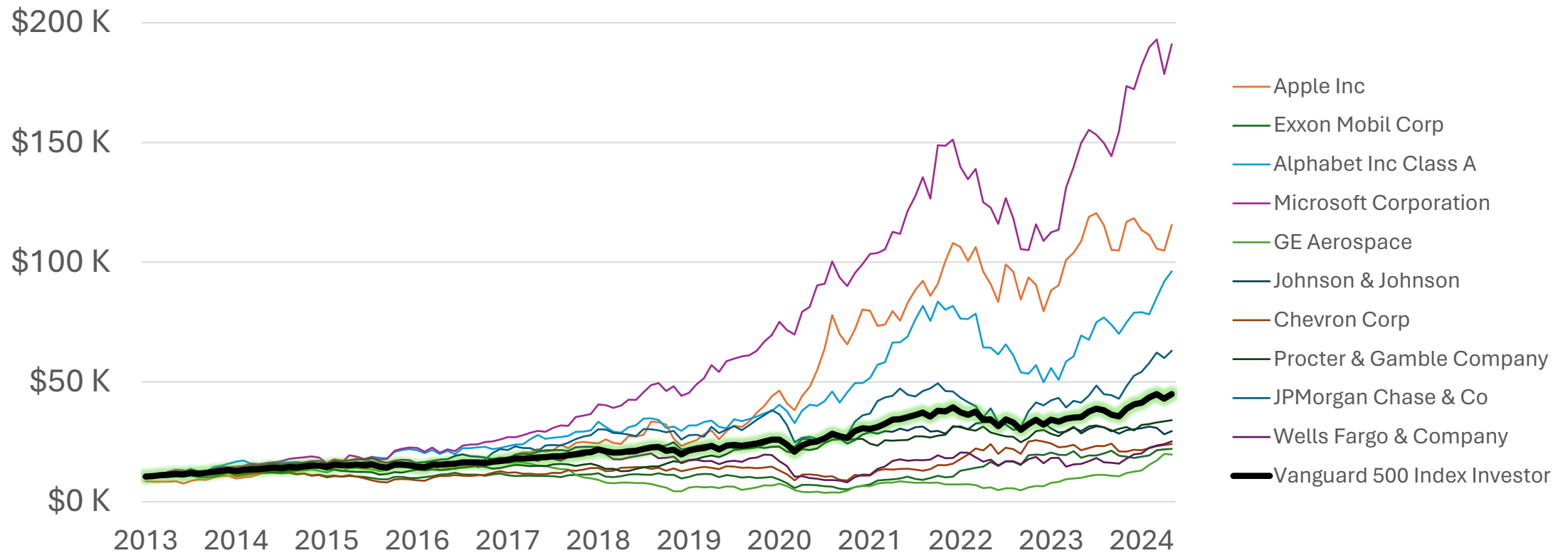


# Today's Agenda

- Why Diversification Matters
- Perspective
- Ingredients
- Mixing
- Simplicity vs. Complexity
- Implications for Accumulators & Retirees
- Summary
- Q&A

# Why Diversification Matters

## Growth of Top 10 S&P 500 Stocks vs. the Index since 2013



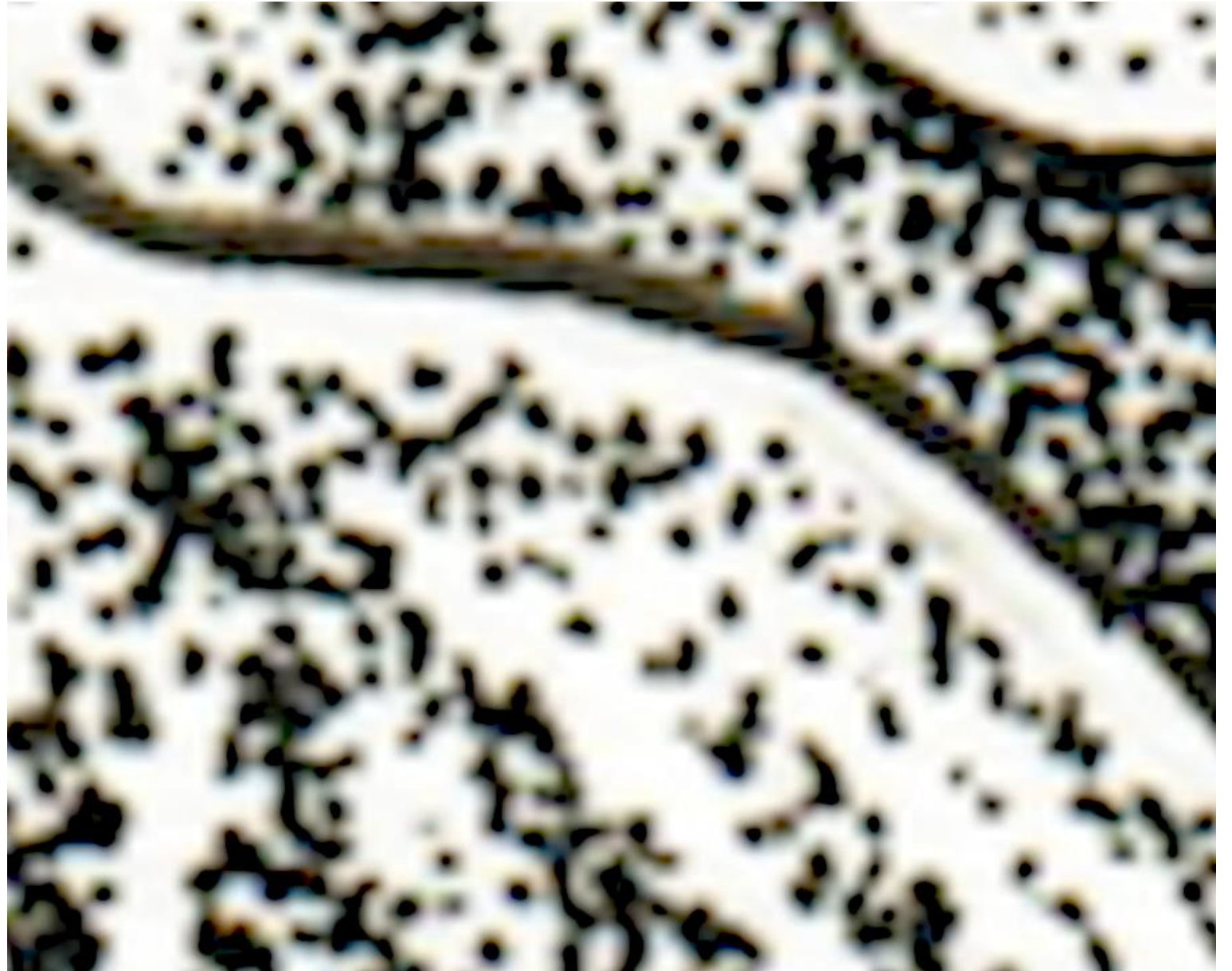




Perspective



What is this?





What is this?



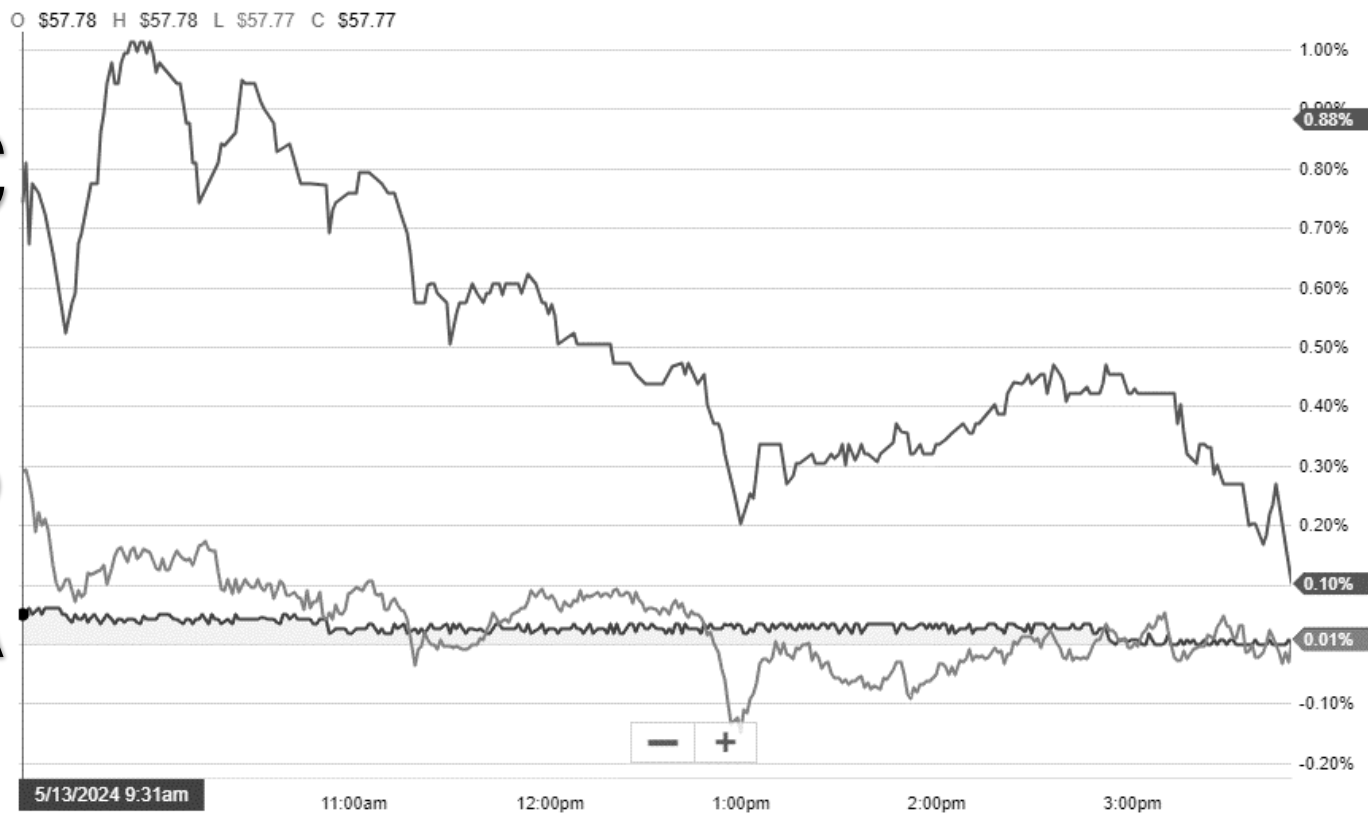


What is this?





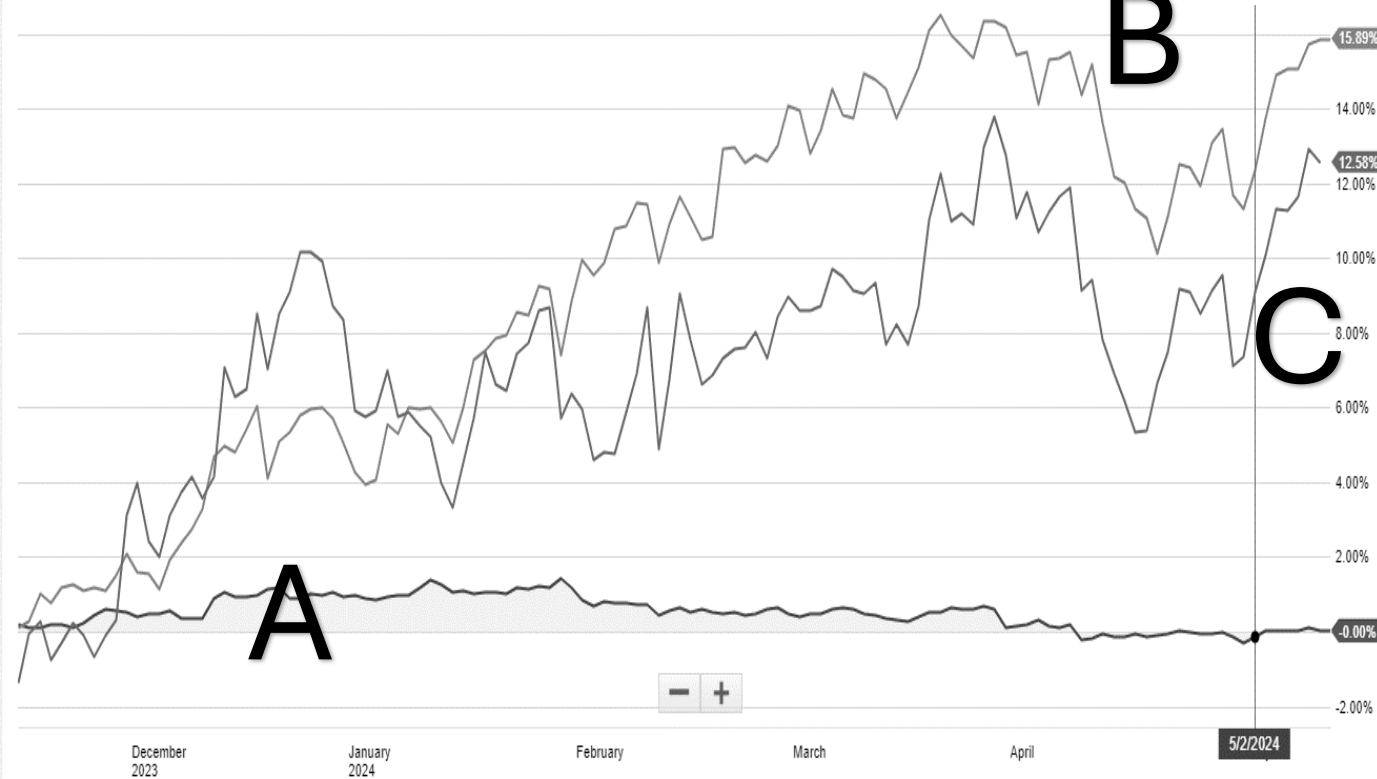
C  
B  
A



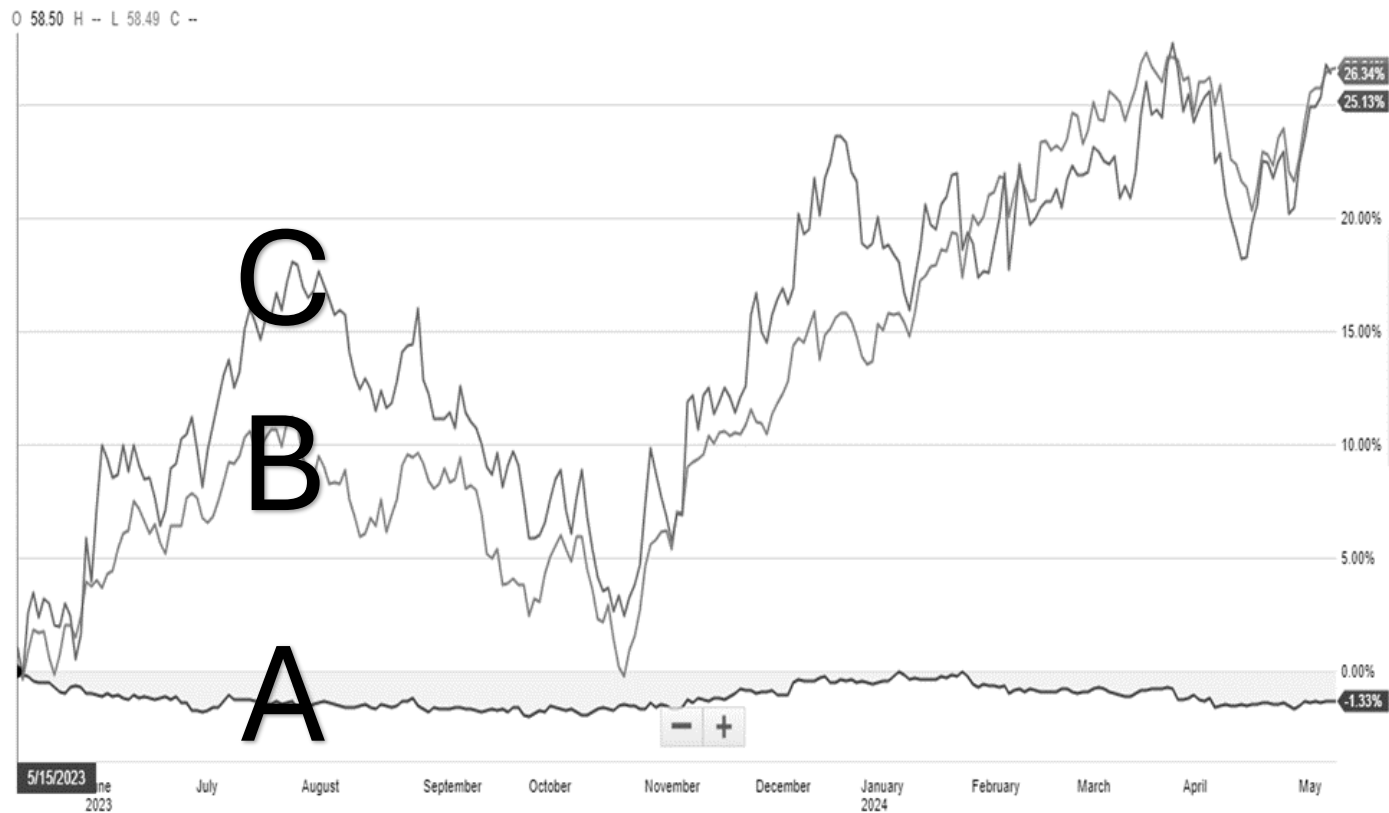
Three  
Investments  
– One Day



O 57.58 H 57.65 L 57.57 C 57.65



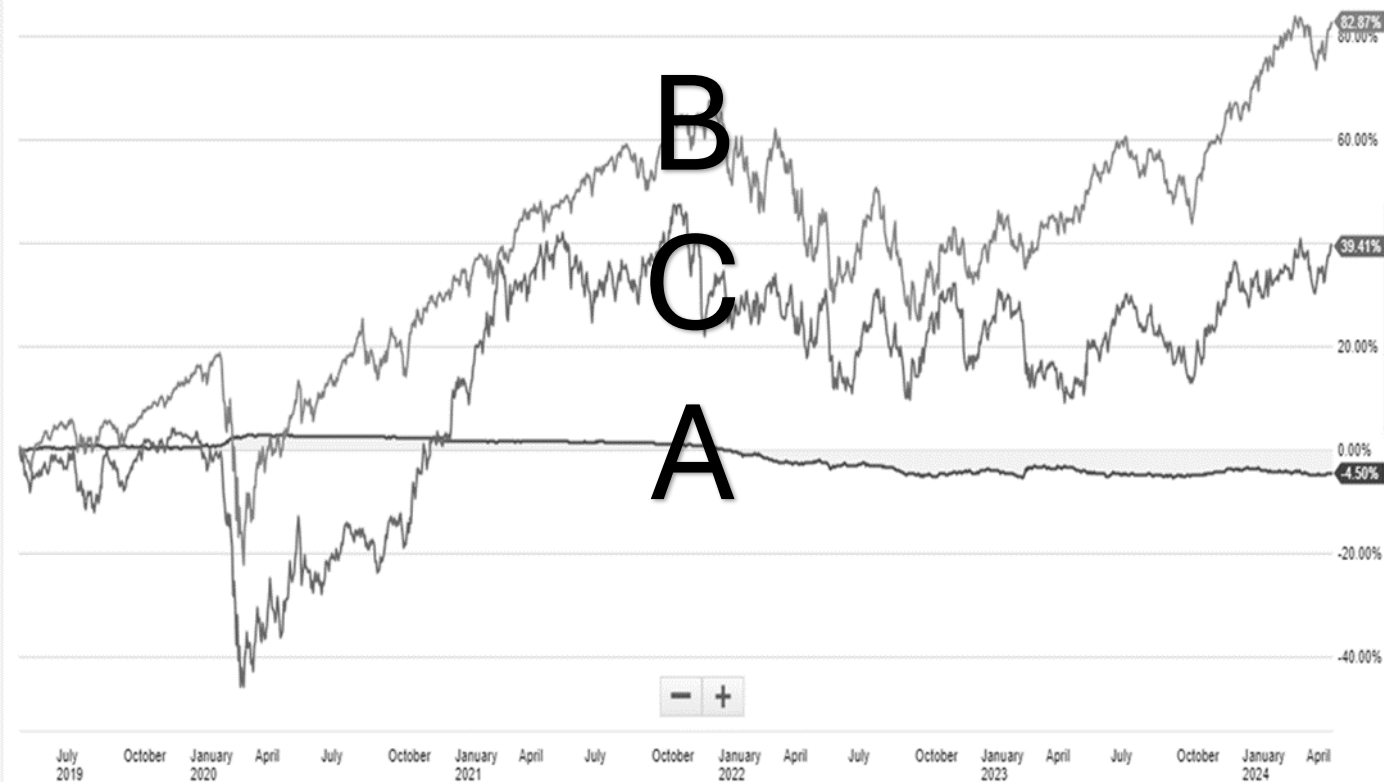
# Three Investments – 6 Months



# Three Investments – 1 Year



O 60.94 H 60.97 L 60.89 C 60.93



# Three Investments – 5 Years

O 61.12 H 61.12 L 60.99 C 61.02

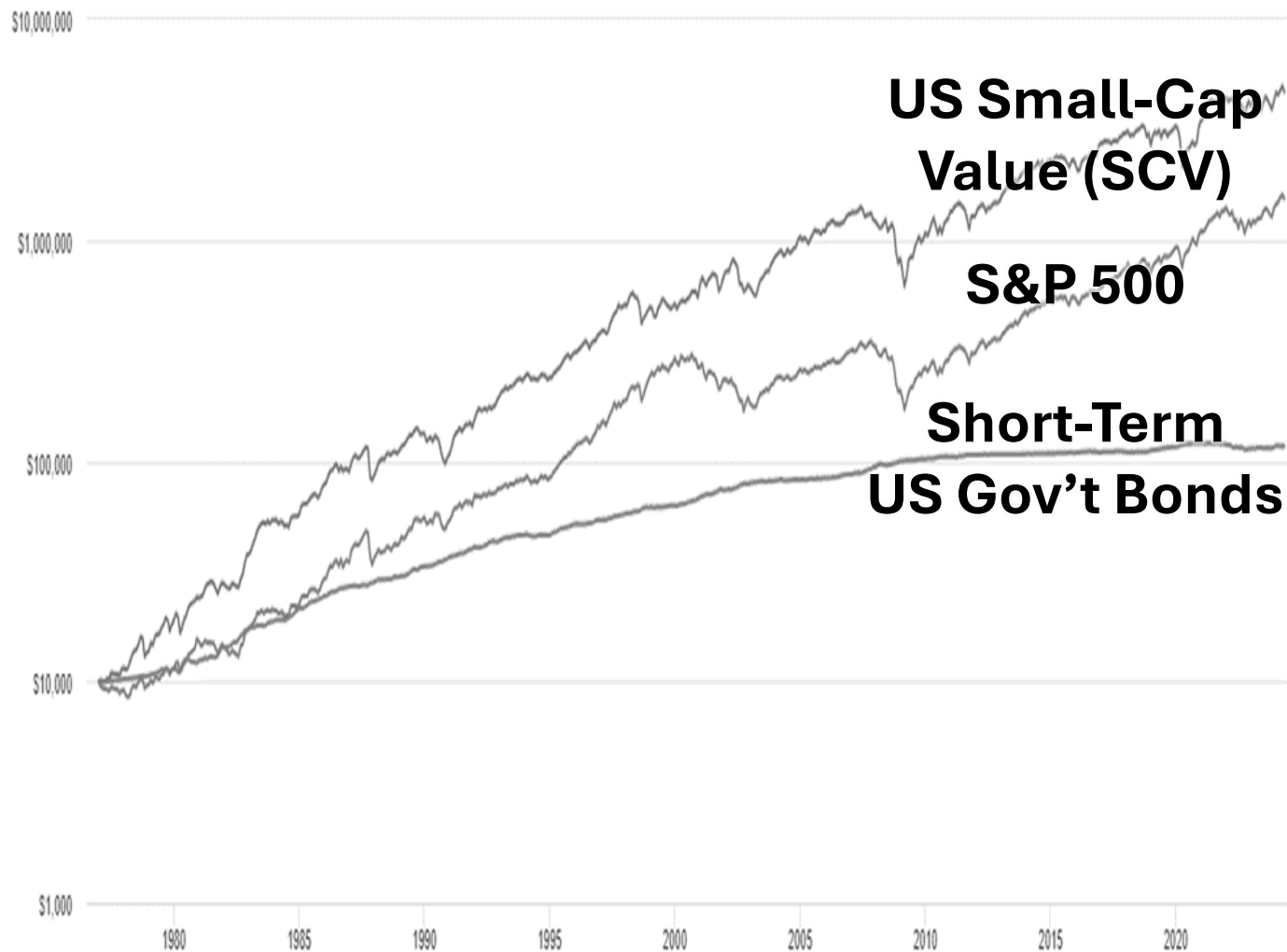


# Three Investments – 10 Years





Three  
Investments  
– 47+ Years



**Three  
Investments  
– 47+ Years**



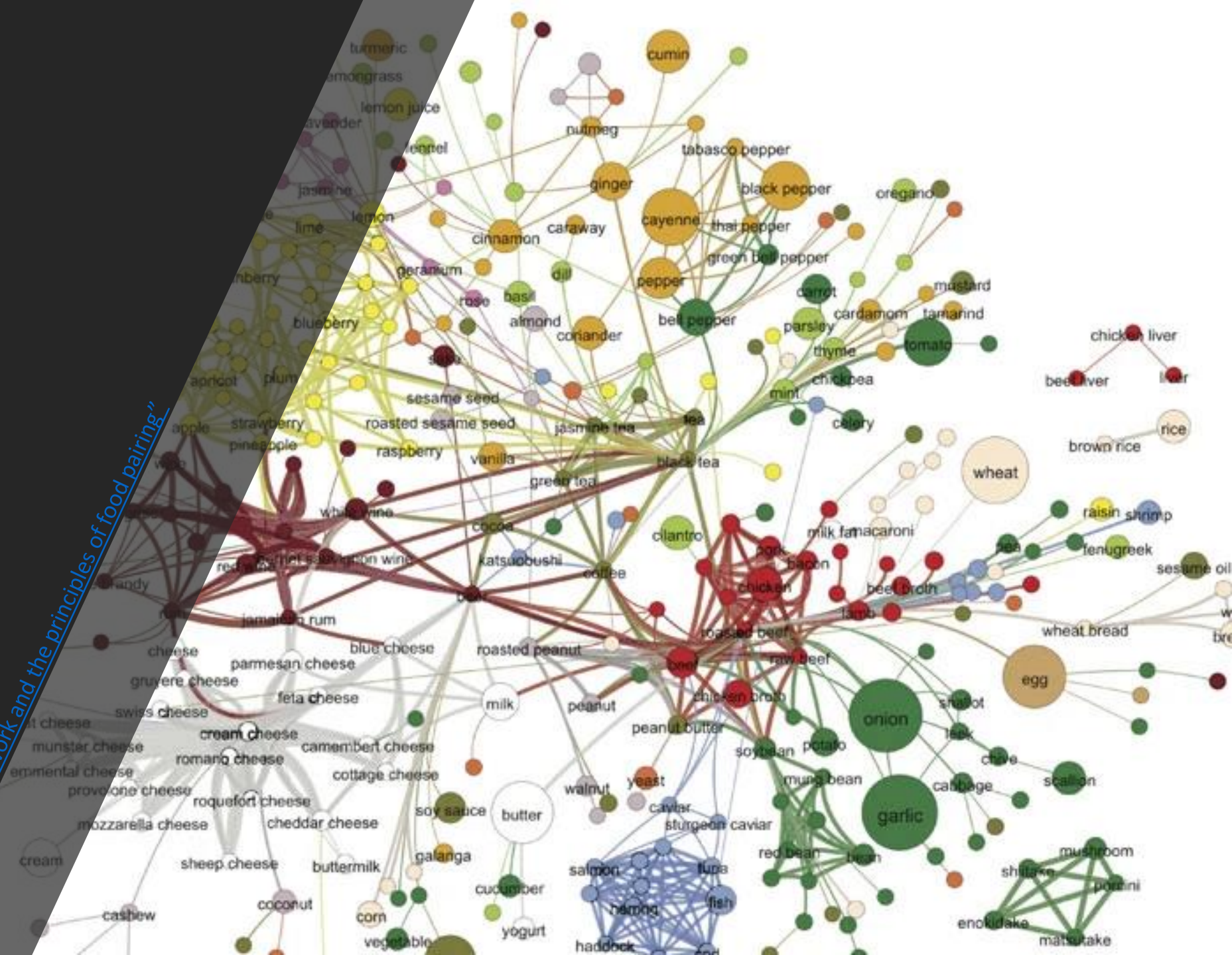


Ingredients

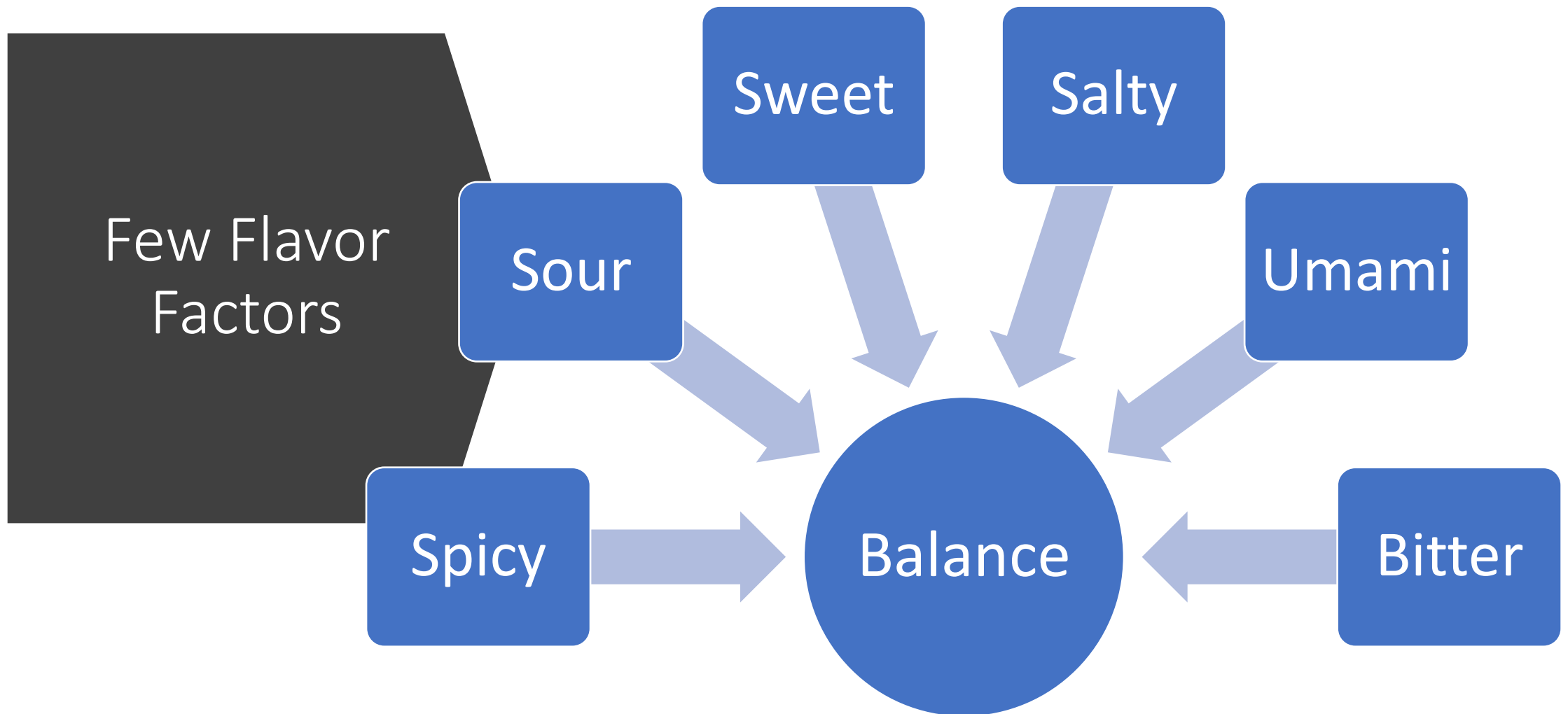


# Many Foods

Source: ["Flavor network and the principles of food pairing"](#)

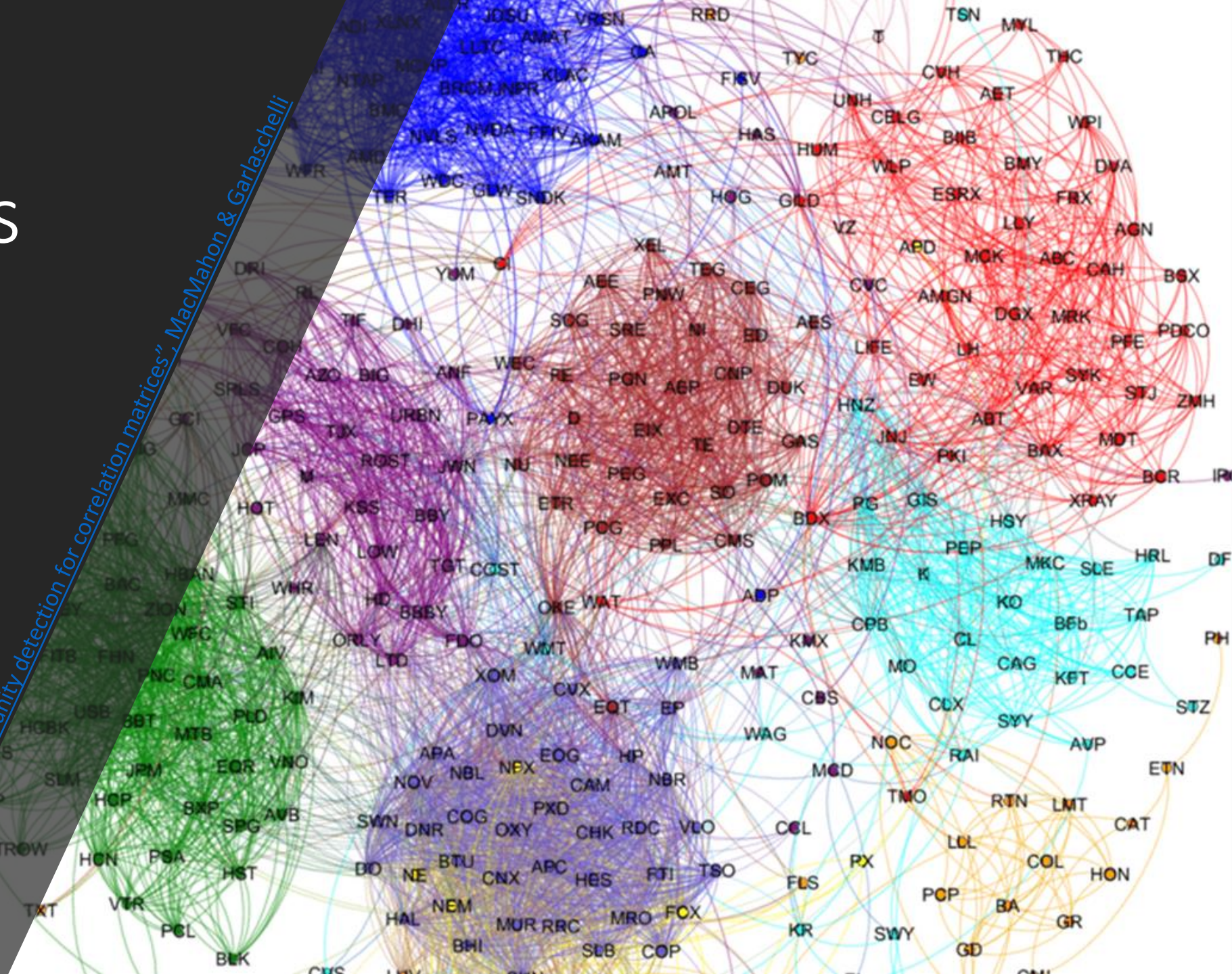




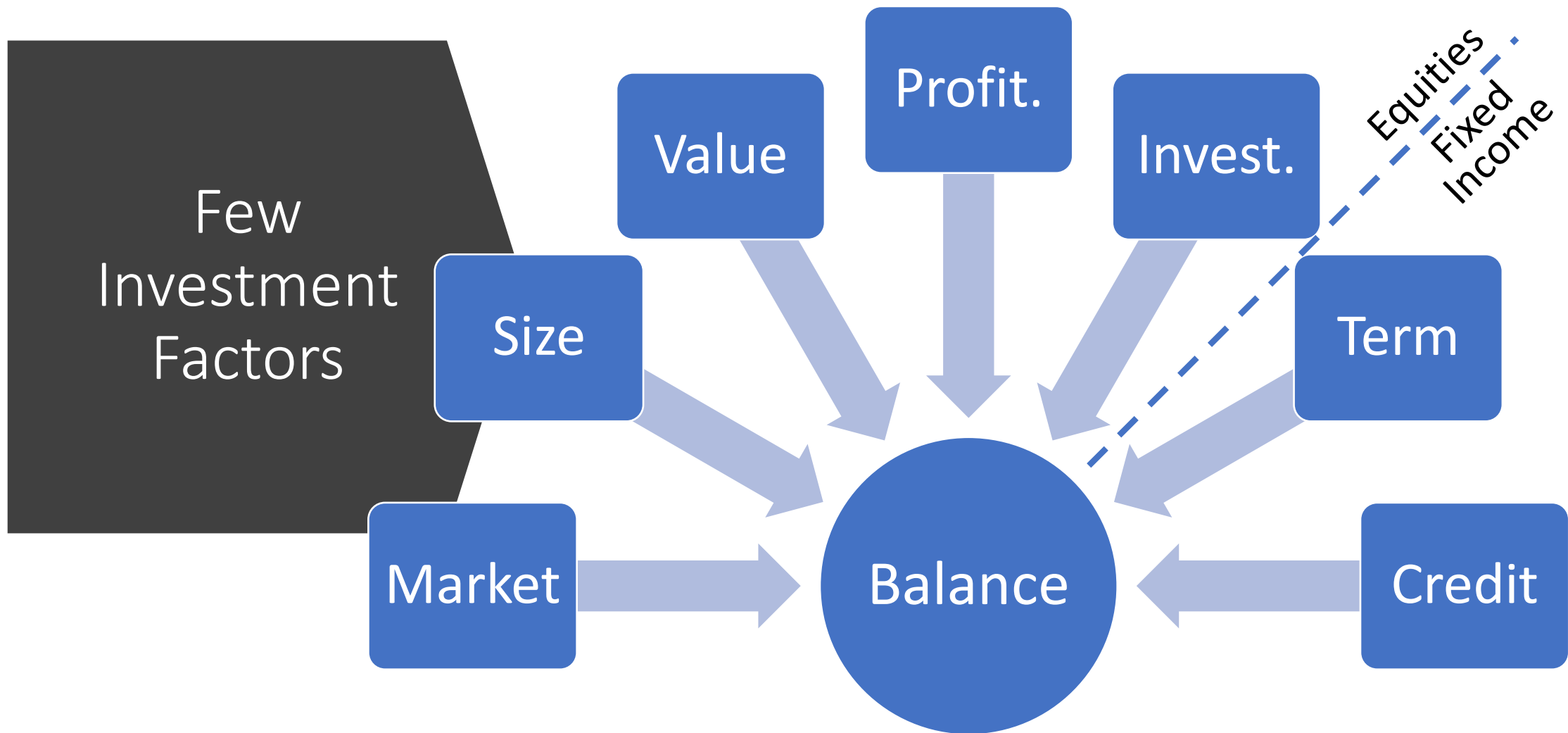


# Many Companies & Bonds

Source: ["Unbiased community detection for correlation matrices", MacMahon & Garlaschelli](#)







# Many Models, Many Premiums

	Fama-French (Jan 1964 – Feb 2024)			AQR (Jan 1964 – Feb 2024)		Alpha Architects (Jan 1992 – Jan 2024)			q-Factors (Jan 1967 – Dec 2022)		
	3-Factor Model	4-Factor Model	5-Factor Model	3-Factor Model	4-to-6-Factor Model	3-Factor Model	4-Factor Model	5-Factor Model	3-Factor Model	4-Factor Model	5-Factor Model
<b>Market</b>	<b>5.8%</b>	<b>5.8%</b>	<b><u>5.5%</u></b>	<b>5.5%</b>	<b>5.5%</b>	<b>8.0%</b>	<b>8.0%</b>	<b>8.0%</b>	<b>5.6%</b>	<b>5.6%</b>	<b>5.6%</b>
<b>Size</b>	<b>1.6%</b>	<b>1.6%</b>	<b><u>2.1%</u></b>	<b>1.1%</b>	<b>1.1%</b>	<b>3.1%</b>	<b>3.1%</b>	<b>3.1%</b>	<b>2.8%</b>	<b>2.8%</b>	<b>2.8%</b>
<b>Value</b>	<b>2.9%</b>	<b>2.9%</b>	<b><u>2.9%</u></b>	<b>2.5%</b>	<b>2.5%</b>	<b>2.3%</b>	<b>2.3%</b>	<b>2.3%</b>			
<b>Momentum</b>		<b>6.4%</b>			<b>6.9%</b>		<b>2.0%</b>	<b>2.0%</b>			
<b>Profitability</b>			<b><u>3.1%</u></b>								
<b>Investment</b>			<b><u>3.0%</u></b>						<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>
<b>Quality</b>					<b>4.3%</b>			<b>0.9%</b>			
<b>Bet-Against-Beta</b>					<b>9.0%</b>						
<b>Return on Equity</b>										<b>6.2%</b>	<b>6.2%</b>
<b>Expected Growth</b>											<b>9.4%</b>

Source: Portfolio Visualizer Factor Statistics Page – US Risk premia shown rounded to nearest 0.1%.

# Fama, French, Cross-Section of Returns

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	1926-2023 Returns by Size and Value (B/M)				
Large	10.68%	8.76%	10.28%	9.52%	9.93%
Med-Lg	11.95%	12.47%	11.58%	10.88%	10.09%
Medium	13.00%	13.26%	12.39%	12.13%	8.86%
Med-Sm	14.68%	13.19%	12.41%	11.80%	7.33%
Small	15.80%	13.97%	11.26%	6.46%	2.37%
	Value	Med-Val	Medium	Med-Gwth	Growth



# Fama, French, Cross-Section of Returns

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	2000-2023 Returns by Size and Value (B/M)				
Large	5.57%	3.68%	8.46%	7.88%	7.63%
Med-Lg	7.57%	9.03%	9.53%	10.58%	8.22%
Medium	10.56%	10.31%	10.14%	10.93%	5.10%
Med-Sm	9.66%	9.33%	10.23%	10.30%	5.57%
Small	12.54%	10.88%	8.05%	7.92%	-0.21%
	Value	Med-Val	Medium	Med-Gwth	Growth



To Get The Premiums & Diversification Benefits, You Have to Tilt

Where do we find  
these ingredients?

## Merriman Best-In-Class ETF Recommendations

	Best-in-Class ( <i>New in 2023</i> )	Alternative Recommendations
US Large Cap Blend	Avantis U.S. Equity (AVUS)	DFA US Equity ETF (DFUS), Vanguard S&P 500 (VOO), Vanguard Total US Market (VTI), iShares Core S&P 500 (IVV), SPDR Large Cap (SPLG), Schwab Large-Cap (SCHX)
US Large Cap Value	Invesco S&P 500 Pure Value (RPV)	Avantis US Large Cap Value (AVLV), Vanguard Russell 1000 Value Index (VONV), iShares Core US Value (IUSV), Schwab S&P 500 Value (SPYV), U.S. Large-Cap Value (SCHV)
US Small Cap Blend	iShares Core S&P Small-Cap (IJR)	Avantis US Small Cap Equity (AVSC), DFA US Small Cap ETF (DFAS), Vanguard S&P Small-Cap 600 Index (VIOO), Russell Micro-Cap (IWC), Schwab U.S. Small-Cap (SCHA), SPDR Small Cap (SPSM)
US Small Cap Value	Avantis U.S. Small Cap Value (AVUV)	DFA US Small Cap Value ETF (DFSV), Vanguard S&P Small-Cap 600 Value (VIOV), SPDR Small Cap Value (SLYV), iShares S&P; SmCp 600 Value (IJS), Invesco S&P SmallCap 600 Pure Value ETF (RZV)
US REIT	Vanguard Real Estate Index (VNQ)	Fidelity MSCI Real Estate (FREL), iShares U.S. REIT (USRT), Schwab U.S. REIT (SCHH)
Int'l Large Cap Blend	Avantis International Equity (AVDE)	Vanguard FTSE Developed Markets (VEA), iShares Core MSCI EAFE (IEFA), SPDR World Ex-US (SPDW), Schwab Intl Equity (SCHF)
Int'l Large Cap Value	<u>DFA International Value (DFIV)</u>	Vanguard International High Dividend (VYMI), Avantis International Large Cap Val ETF (AVIV), iShares MSCI EAFE Value (EFV), iShares MSCI EAFE Value, Fidelity International Value Factor ETF (FIVA), SPDR S&P Intl Dividend (DWX)
Int'l Small Cap Blend	Schwab Fundamental International Small Company Index (FNDC)	DFA International Small Cap ETF (DFIS), Vanguard FTSE All-World ex-US Small-Cap Index (VSS), iShares MSCI EAFE SmCap (SCZ), SPDR S&P Intl. Small Cap (GWX), Schwab Intl Sm-Cp Equity (SCHC)
Int'l Small Cap Value	Avantis International Small Cap Value (AVDV)	DFA International Small Cap Value I (DISV), WisdomTree Intl. S. Cap Div (DLS)
Emerging Markets	Avantis Emerging Markets Equity (AVEM)	DFA Emerging Core Equity Market ETF (DFAE), Vanguard FTSE Emerging Markets (VWO), iShares Core MSCI EmMkts. (IEMG), SPDR Emerging Markets (SPEM), Schwab Emerging Mkt Eq (SCHE)
EM Large Cap Value	<u>Avantis Emerging Markets Value (AVES)</u>	Dimensional Emerging Markets Value ETF (DFEV)
EM Small Cap Blend	<u>iShares MSCI Em. Mkts. Sm.-Cap (EEMS)</u>	SPDR Emerging Mkts. S. Cap (EWX), WisdomTree Em. Markets SmCp Div ETF (DGS)
Int'l REITs	---	Vanguard Global ex-US Real Estate (VNQI), iShares FTSE Real Estate ex-US (IFGL)
Short-Term Bonds	Vanguard Short-Term Gov't Bond (VGSH)	iShares Barclays ST Treas. (SHY), SPDR ST Treas. (SPTS), Schwab ST U.S. Treas. (SCHO)
Int.-Term Bonds	SPDR Inter. Term Treasury (SPTI)	iShares Barclays 7-10 Yr Treasury (IEF), Vanguard Intermediate-Term Government Bond (VGIT), Schwab I-T U.S. Treasury (SCHR)
Infl.-Prot. Bonds	Vanguard Short-Term Infl. Prot. Sec. (VTIP)	iShares Barclays 0-5 TIPS (STIP), Schwab U.S. TIPS (SCHP)



Mixing



# Ultimate Buy & Hold Diversified Portfolio

Table A1 - Ultimate Buy & Hold Equity Portfolio (50% US/50% Int'l)

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
<b>1970 - 2022 (53 years) (with ANNUAL rebalancing)</b>	<b>Portfolio 1 S&amp;P 500</b>	<b>Portfolio 2</b>	<b>Portfolio 3</b>	<b>Portfolio 4</b>	<b>Portfolio 5</b>	<b>Portfolio 6</b>	<b>Portfolio 7 WW UBH</b>
Initial \$100,000 Grew to:	\$18,906,960	\$20,783,828	\$22,326,248	\$27,005,724	\$27,628,666	\$35,665,979	\$41,821,137
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.7%	12.1%
Annualized Standard Deviation	17.2%	17.1%	17.2%	17.3%	17.1%	17.9%	18.5%
Difference from Portfolio 1	\$0	\$1,876,868	\$3,419,289	\$8,098,764	\$8,721,706	\$16,759,020	\$22,914,178

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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

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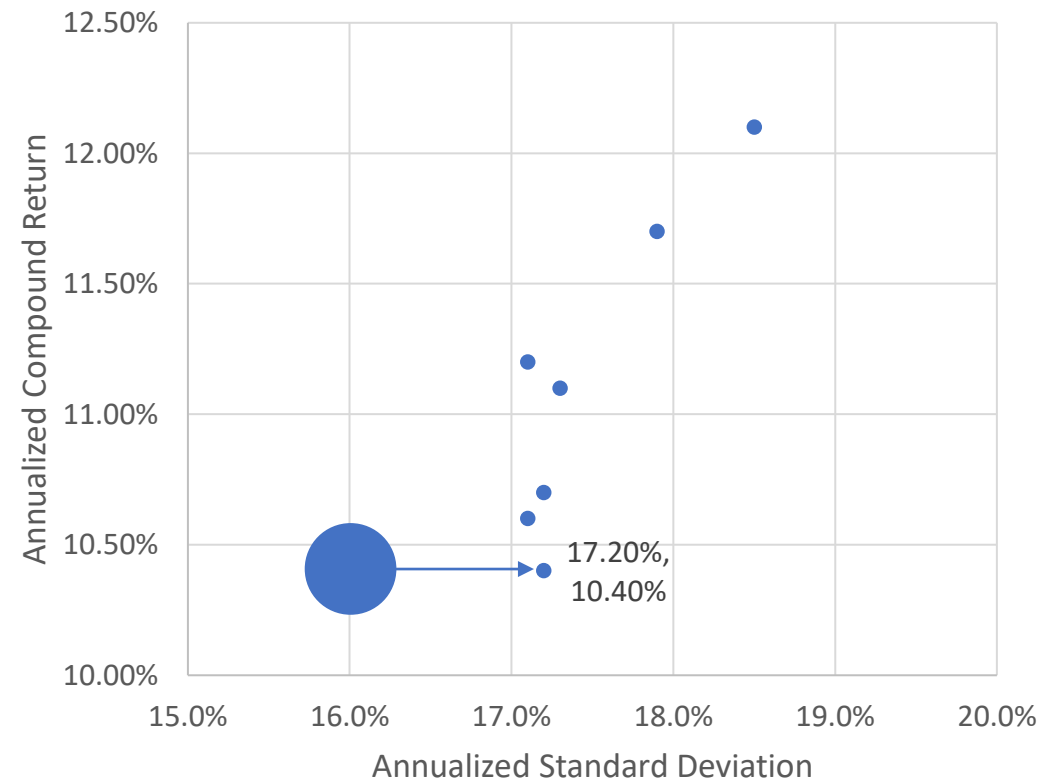
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#2	90%	10%								
#3	80%	10%	10%							
#4	70%	10%	10%	10%						
#5	60%	10%	10%	10%	10%					
#6	20%	10%	10%	10%	10%	10%	10%	10%	10%	
#7 / UB&H	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Return versus Risk



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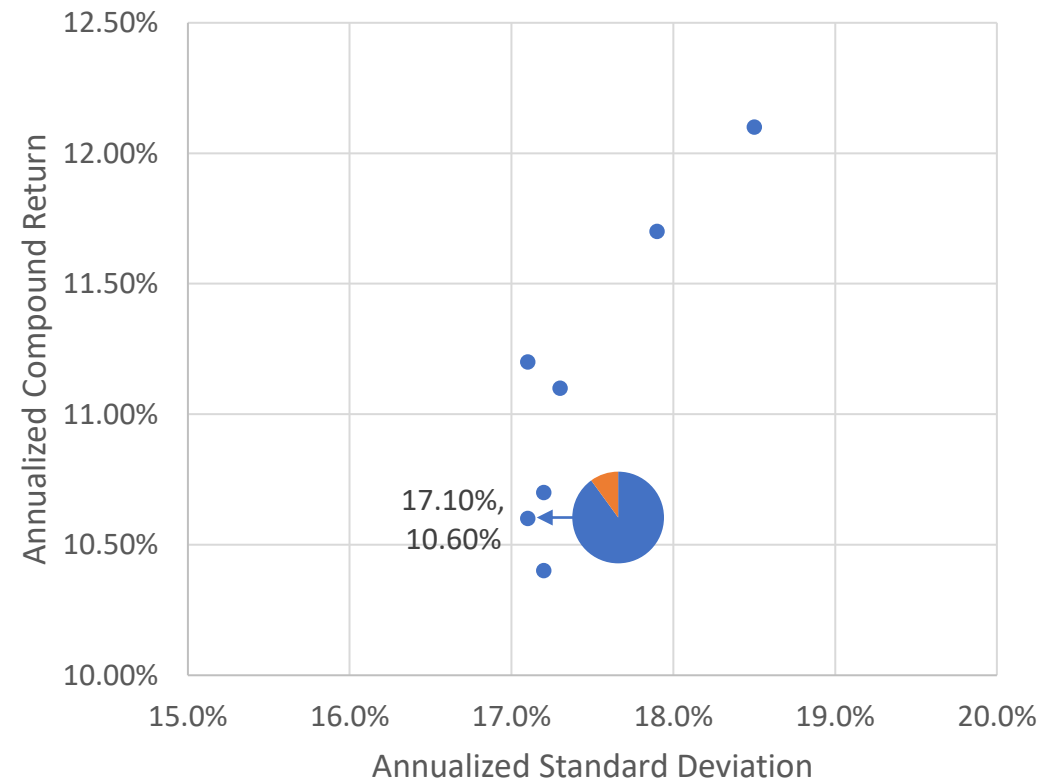
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#4	70%	10%	10%	10%						
#5	60%	10%	10%	10%	10%					
#6	20%	10%	10%	10%	10%	10%	10%	10%	10%	
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Return versus Risk



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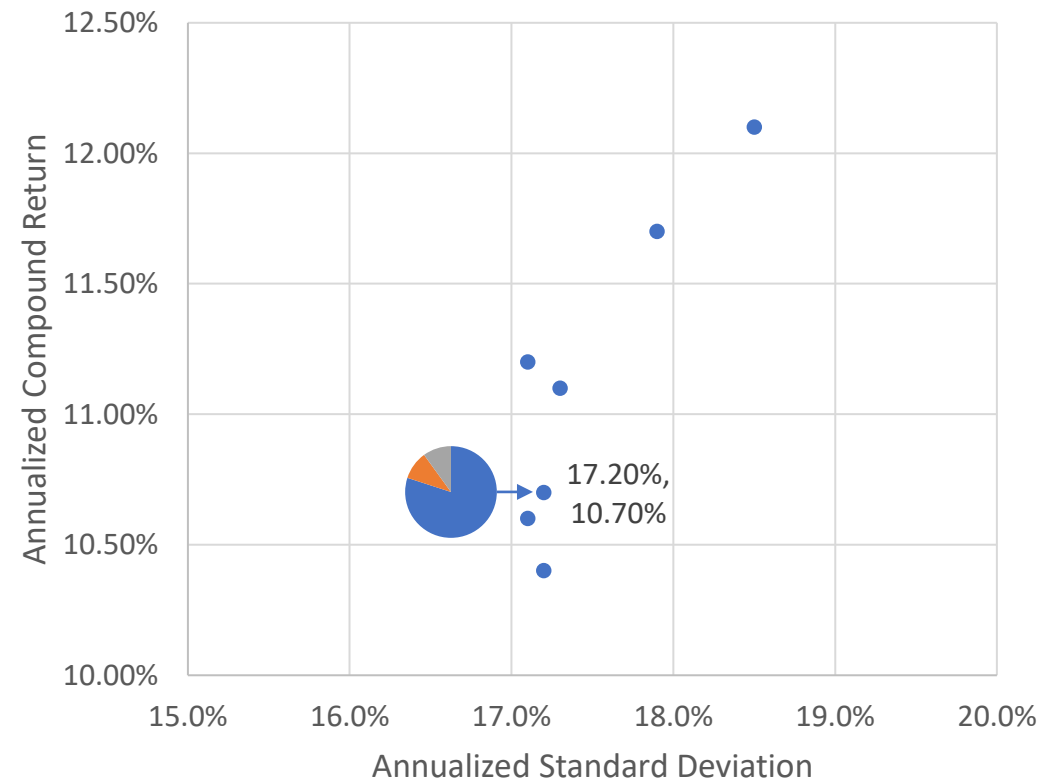
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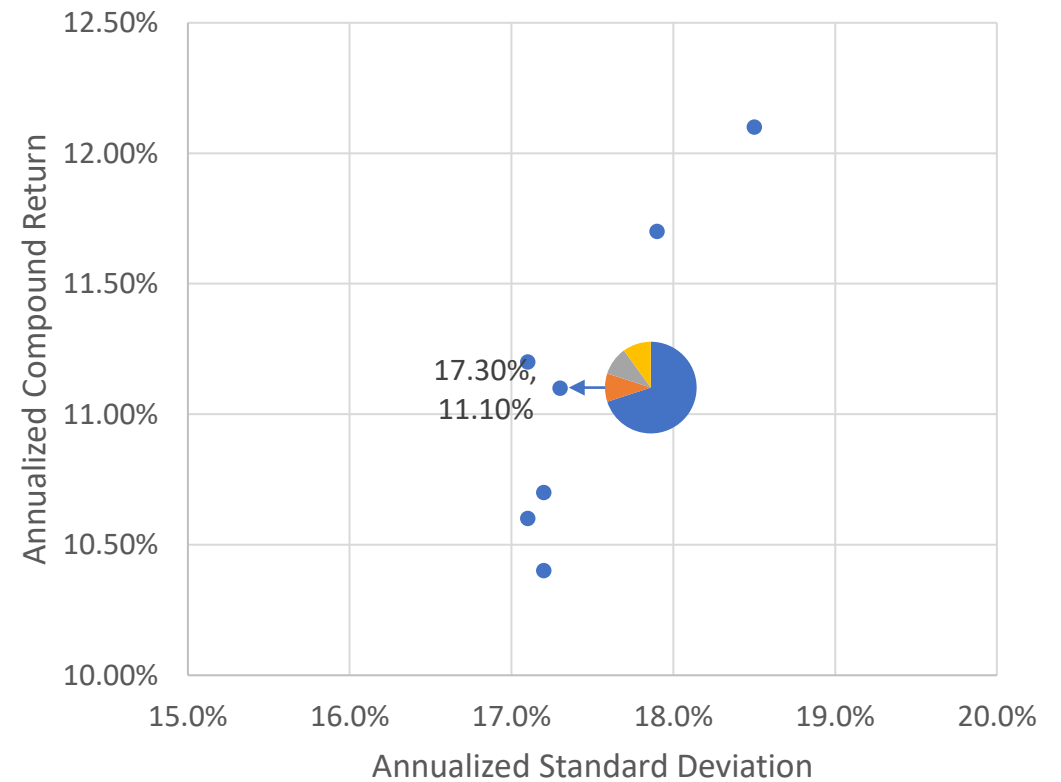
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Return versus Risk



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	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
<b>1970 - 2022 (53 years) (with ANNUAL rebalancing)</b>	<b>Portfolio 1 S&amp;P 500</b>	<b>Portfolio 2</b>	<b>Portfolio 3</b>	<b>Portfolio 4</b>	<b>Portfolio 5</b>	<b>Portfolio 6</b>	<b>Portfolio 7 WW UBH</b>
Initial \$100,000 Grew to:	\$18,906,960	\$20,783,828	\$22,326,248	\$27,005,724	\$27,628,666	\$35,665,979	\$41,821,137
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.7%	12.1%
Annualized Standard Deviation	17.2%	17.1%	17.2%	17.3%	17.1%	17.9%	18.5%
Difference from Portfolio 1	\$0	\$1,876,868	\$3,419,289	\$8,098,764	\$8,721,706	\$16,759,020	\$22,914,178

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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
<b>1970 - 2022 (53 years) (with MONTHLY rebalancing)</b>	<b>Portfolio 1 S&amp;P 500</b>	<b>Portfolio 2</b>	<b>Portfolio 3</b>	<b>Portfolio 4</b>	<b>Portfolio 5</b>	<b>Portfolio 6</b>	<b>Portfolio 7 WW UBH</b>
Initial \$100,000 Grew to:	\$18,906,960	\$20,694,765	\$22,176,579	\$26,539,200	\$27,169,780	\$33,119,454	\$37,390,920
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.6%	11.8%
"Annualized" Monthly Standard Dev.	17.2%	17.2%	17.5%	17.8%	17.6%	17.1%	17.5%
Difference from Portfolio 1	\$0	\$1,787,805	\$3,269,619	\$7,632,240	\$8,262,820	\$14,212,495	\$18,483,960

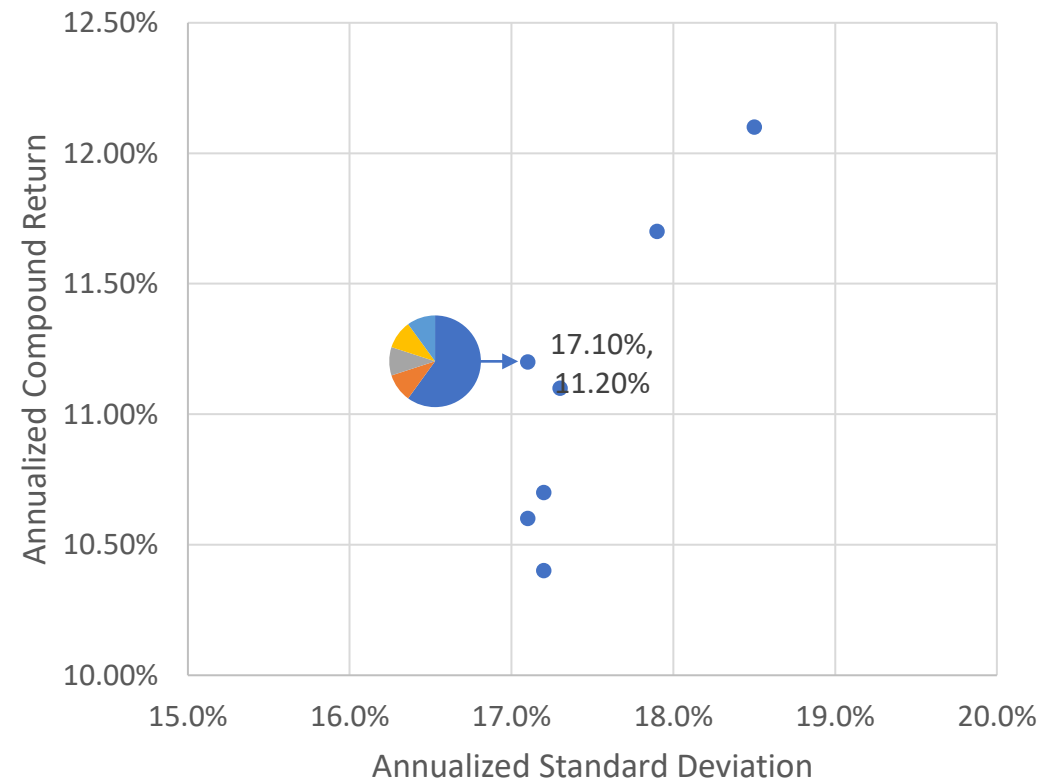
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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

Ultimate Buy & Hold Equity Portfolio Asset Allocation (50% US/50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt
#1	100%									
#2	90%	10%								
#3	80%	10%	10%							
#4	70%	10%	10%	10%						
#5	60%	10%	10%	10%	10%					
#6	20%	10%	10%	10%	10%	10%	10%	10%	10%	
#7 / UB&H	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Return versus Risk



# Ultimate Buy & Hold Diversified Portfolio

Table A1 - Ultimate Buy & Hold Equity Portfolio (50% US/50% Int'l)

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
<b>1970 - 2022 (53 years) (with ANNUAL rebalancing)</b>	<b>Portfolio 1 S&amp;P 500</b>	<b>Portfolio 2</b>	<b>Portfolio 3</b>	<b>Portfolio 4</b>	<b>Portfolio 5</b>	<b>Portfolio 6</b>	<b>Portfolio 7 WW UBH</b>
Initial \$100,000 Grew to:	\$18,906,960	\$20,783,828	\$22,326,248	\$27,005,724	\$27,628,666	\$35,665,979	\$41,821,137
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.7%	12.1%
Annualized Standard Deviation	17.2%	17.1%	17.2%	17.3%	17.1%	17.9%	18.5%
Difference from Portfolio 1	\$0	\$1,876,868	\$3,419,289	\$8,098,764	\$8,721,706	\$16,759,020	\$22,914,178

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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
<b>1970 - 2022 (53 years) (with MONTHLY rebalancing)</b>	<b>Portfolio 1 S&amp;P 500</b>	<b>Portfolio 2</b>	<b>Portfolio 3</b>	<b>Portfolio 4</b>	<b>Portfolio 5</b>	<b>Portfolio 6</b>	<b>Portfolio 7 WW UBH</b>
Initial \$100,000 Grew to:	\$18,906,960	\$20,694,765	\$22,176,579	\$26,539,200	\$27,169,780	\$33,119,454	\$37,390,920
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.6%	11.8%
"Annualized" Monthly Standard Dev.	17.2%	17.2%	17.5%	17.8%	17.6%	17.1%	17.5%
Difference from Portfolio 1	\$0	\$1,787,805	\$3,269,619	\$7,632,240	\$8,262,820	\$14,212,495	\$18,483,960

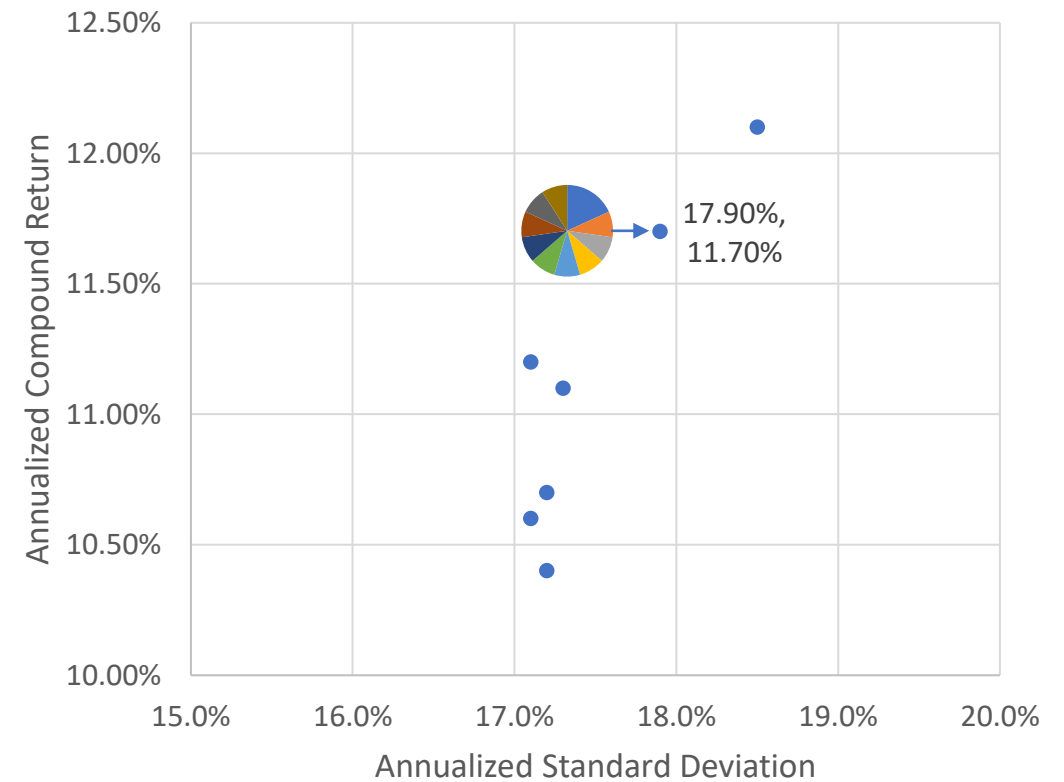
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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

Ultimate Buy & Hold Equity Portfolio Asset Allocation (50% US/50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt
#1	100%									
#2	90%	10%								
#3	80%	10%	10%							
#4	70%	10%	10%	10%						
#5	60%	10%	10%	10%	10%					
#6	20%	10%	10%	10%	10%	10%	10%	10%	10%	
#7 / UB&H	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Return versus Risk



# Ultimate Buy & Hold Diversified Portfolio

Table A1 - Ultimate Buy & Hold Equity Portfolio (50% US/50% Int'l)

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
<b>1970 - 2022 (53 years) (with ANNUAL rebalancing)</b>	<b>Portfolio 1 S&amp;P 500</b>	<b>Portfolio 2</b>	<b>Portfolio 3</b>	<b>Portfolio 4</b>	<b>Portfolio 5</b>	<b>Portfolio 6</b>	<b>Portfolio 7 WW UBH</b>
Initial \$100,000 Grew to:	\$18,906,960	\$20,783,828	\$22,326,248	\$27,005,724	\$27,628,666	\$35,665,979	\$41,821,137
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.7%	12.1%
Annualized Standard Deviation	17.2%	17.1%	17.2%	17.3%	17.1%	17.9%	18.5%
Difference from Portfolio 1	\$0	\$1,876,868	\$3,419,289	\$8,098,764	\$8,721,706	\$16,759,020	\$22,914,178

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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
<b>1970 - 2022 (53 years) (with MONTHLY rebalancing)</b>	<b>Portfolio 1 S&amp;P 500</b>	<b>Portfolio 2</b>	<b>Portfolio 3</b>	<b>Portfolio 4</b>	<b>Portfolio 5</b>	<b>Portfolio 6</b>	<b>Portfolio 7 WW UBH</b>
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Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.6%	11.8%
"Annualized" Monthly Standard Dev.	17.2%	17.2%	17.5%	17.8%	17.6%	17.1%	17.5%
Difference from Portfolio 1	\$0	\$1,787,805	\$3,269,619	\$7,632,240	\$8,262,820	\$14,212,495	\$18,483,960

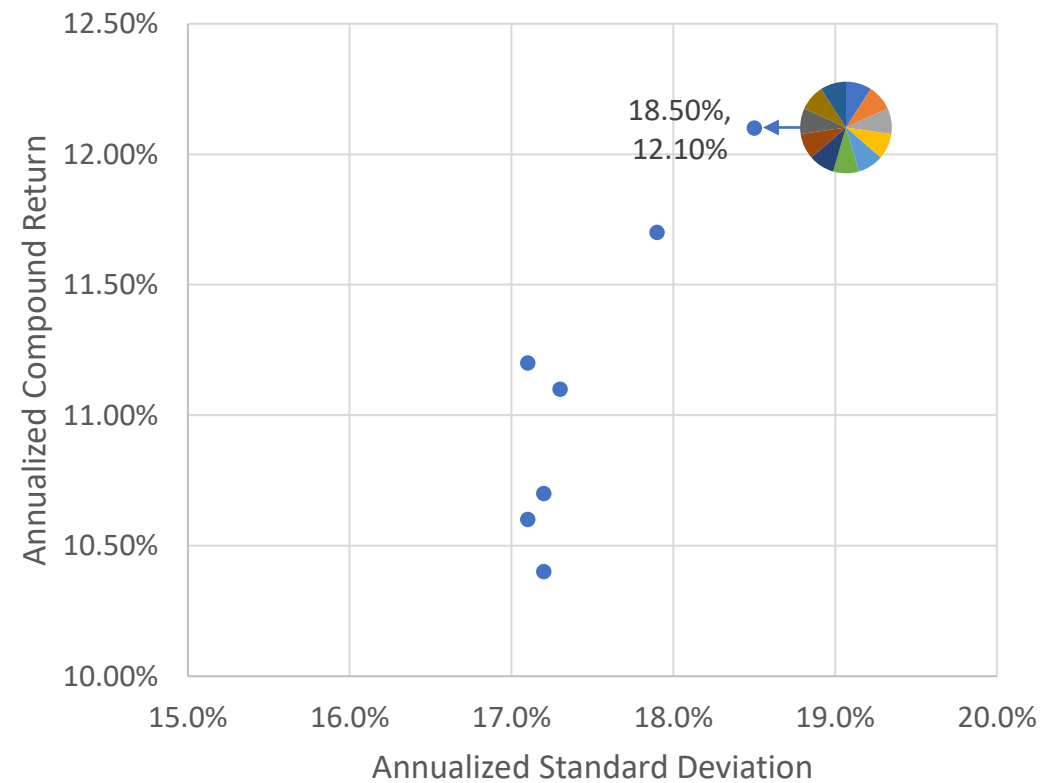
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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

Ultimate Buy & Hold Equity Portfolio Asset Allocation (50% US/50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt
#1	100%									
#2	90%	10%								
#3	80%	10%	10%							
#4	70%	10%	10%	10%						
#5	60%	10%	10%	10%	10%					
#6	20%	10%	10%	10%	10%	10%	10%	10%	10%	
#7 / UB&H	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Return versus Risk





# Ultimate Buy & Hold Diversified Portfolio

Table A1 - Ultimate Buy & Hold Equity Portfolio (50% US/50% Int'l)

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
1970 - 2022 (53 years) (with ANNUAL rebalancing)	Portfolio 1 S&P 500	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7 WW UBH
Initial \$100,000 Grew to:	\$18,906,960	\$20,783,828	\$22,326,248	\$27,005,724	\$27,628,666	\$35,665,979	\$41,821,137
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.7%	12.1%
Annualized Standard Deviation	17.2%	17.1%	17.2%	17.3%	17.1%	17.9%	18.5%
Difference from Portfolio 1	\$0	\$1,876,868	\$3,419,289	\$8,098,764	\$8,721,706	\$16,759,020	\$22,914,178

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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
1970 - 2022 (53 years) (with MONTHLY rebalancing)	Portfolio 1 S&P 500	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7 WW UBH
Initial \$100,000 Grew to:	\$18,906,960	\$20,694,765	\$22,176,579	\$26,539,200	\$27,169,780	\$33,119,454	\$37,390,920
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.6%	11.8%
"Annualized" Monthly Standard Dev.	17.2%	17.2%	17.5%	17.8%	17.6%	17.1%	17.5%
Difference from Portfolio 1	\$0	\$1,787,805	\$3,269,619	\$7,632,240	\$8,262,820	\$14,212,495	\$18,483,960

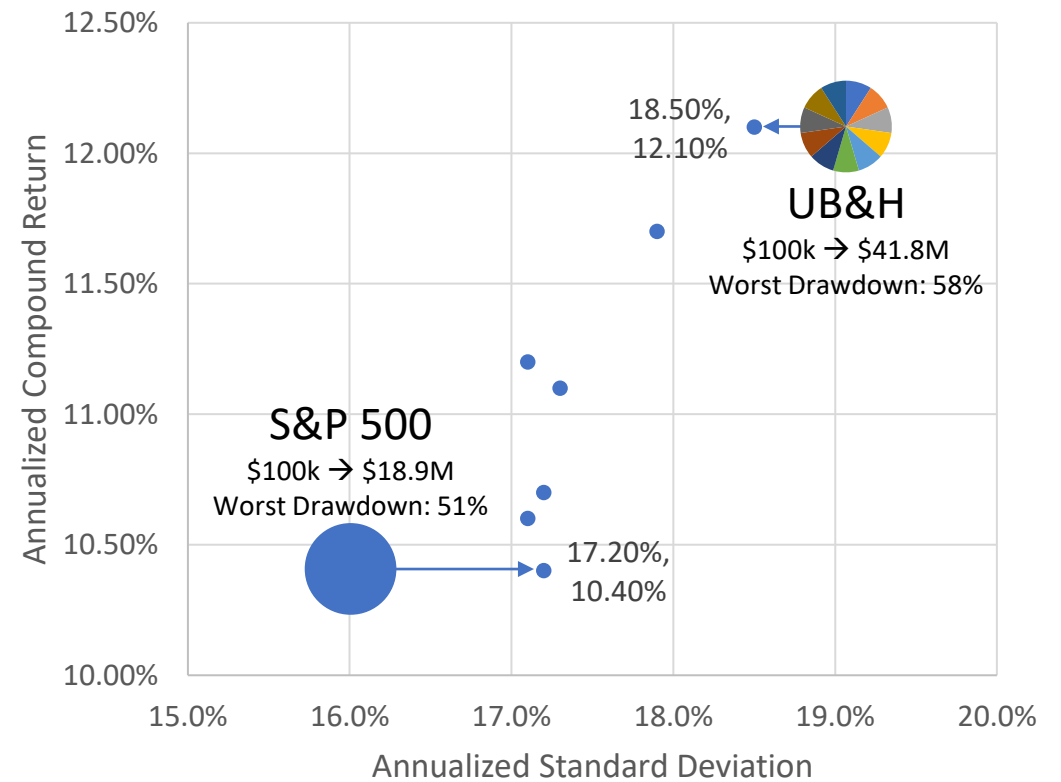
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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

Ultimate Buy & Hold Equity Portfolio Asset Allocation (50% US/50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt
#1	100%									
#2	90%	10%								
#3	80%	10%	10%							
#4	70%	10%	10%	10%						
#5	60%	10%	10%	10%	10%					
#6	20%	10%	10%	10%	10%	10%	10%	10%	10%	
#7 / UB&H	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Return versus Risk



# Ultimate Buy & Hold Diversified Portfolio

Table A1 - Ultimate Buy & Hold Equity Portfolio (50% US/50% Int'l)

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
1970 - 2022 (53 years) (with ANNUAL rebalancing)	Portfolio 1 S&P 500	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7 WW UBH
Initial \$100,000 Grew to:	\$18,906,960	\$20,783,828	\$22,326,248	\$27,005,724	\$27,628,666	\$35,665,979	\$41,821,137
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.7%	12.1%
Annualized Standard Deviation	17.2%	17.1%	17.2%	17.3%	17.1%	17.9%	18.5%
Difference from Portfolio 1	\$0	\$1,876,868	\$3,419,289	\$8,098,764	\$8,721,706	\$16,759,020	\$22,914,178

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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

	World-Wide Equity Portfolio Build-Up ----->						
	S&P 500	+US LCV	+US SCB	+US SCV	+US REITs	+Int'l	+ EM
1970 - 2022 (53 years) (with MONTHLY rebalancing)	Portfolio 1 S&P 500	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7 WW UBH
Initial \$100,000 Grew to:	\$18,906,960	\$20,694,765	\$22,176,579	\$26,539,200	\$27,169,780	\$33,119,454	\$37,390,920
Annualized Compound Return	10.4%	10.6%	10.7%	11.1%	11.2%	11.6%	11.8%
"Annualized" Monthly Standard Dev.	17.2%	17.2%	17.5%	17.8%	17.6%	17.1%	17.5%
Difference from Portfolio 1	\$0	\$1,787,805	\$3,269,619	\$7,632,240	\$8,262,820	\$14,212,495	\$18,483,960

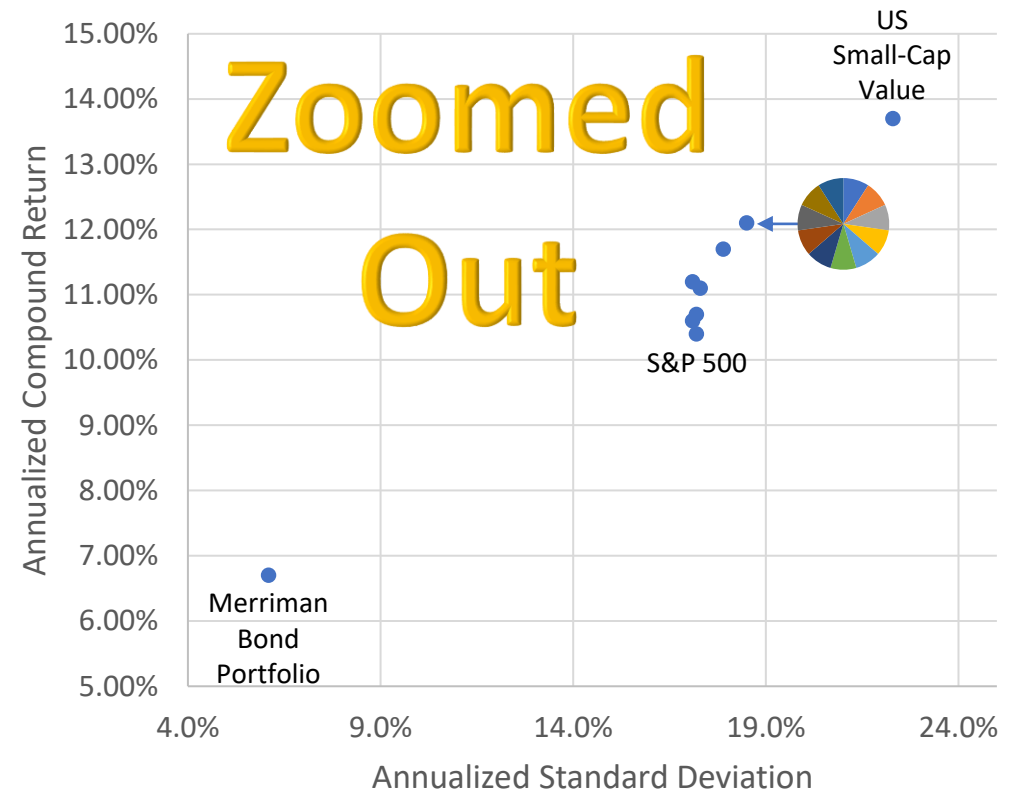
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Note: Index returns reduced by the equivalent of a representative fund's expense ratio.

Ultimate Buy & Hold Equity Portfolio Asset Allocation (50% US/50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt
#1	100%									
#2	90%	10%								
#3	80%	10%	10%							
#4	70%	10%	10%	10%						
#5	60%	10%	10%	10%	10%					
#6	20%	10%	10%	10%	10%	10%	10%	10%	10%	
#7 / UB&H	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Return versus Risk



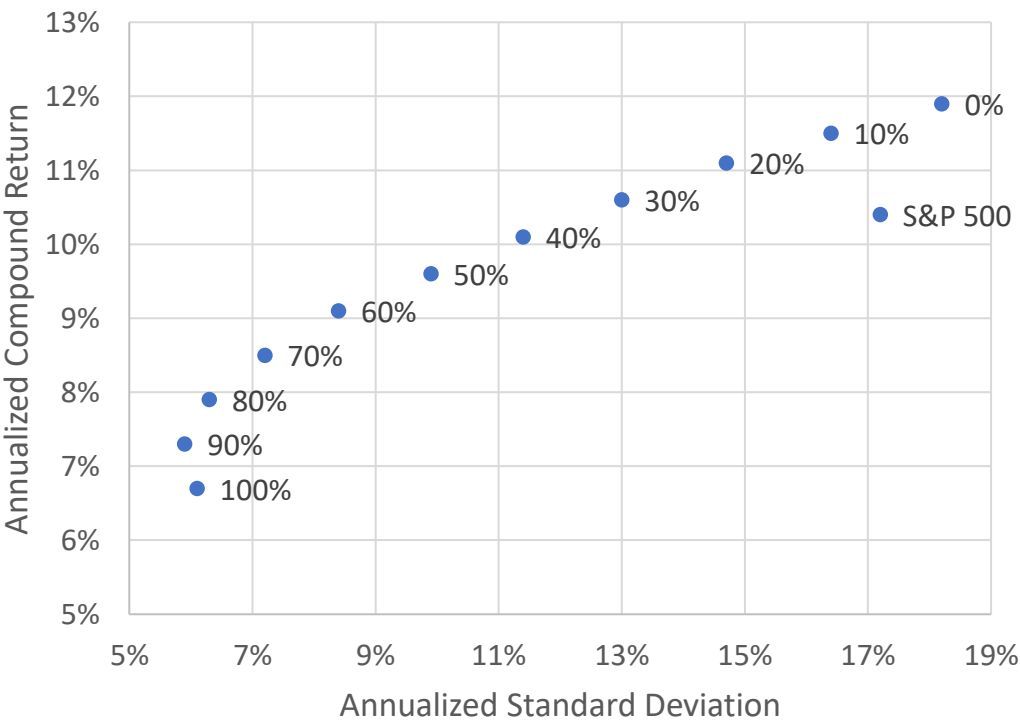
# Diversifying with Fixed Income (Bonds)

Table B2a - Fine Tuning Table: WW UBH Equity Portfolio (50% US/50% Int'l)  
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.

Year	100% Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	100% Equity	S&P 500 Index
1970	15.4%	14.1%	12.8%	11.5%	10.2%	8.9%	7.5%	6.2%	4.8%	3.5%	2.1%	4.0%
1971	8.3%	10.4%	12.4%	14.5%	16.6%	18.7%	20.8%	22.9%	25.1%	27.2%	29.4%	14.3%
1972	5.6%	7.4%	9.2%	11.0%	12.9%	14.8%	16.7%	18.6%	20.5%	22.5%	24.4%	19.0%
1973	6.0%	4.0%	2.1%	0.1%	-1.8%	-3.8%	-5.7%	-7.6%	-9.5%	-11.3%	-13.2%	-14.7%
1974	7.0%	2.7%	-1.5%	-5.5%	-9.4%	-13.2%	-16.9%	-20.4%	-23.9%	-27.2%	-30.4%	-26.5%
1975	9.5%	13.0%	16.5%	20.0%	23.6%	27.2%	30.9%	34.7%	38.5%	42.3%	46.2%	37.2%
1976	12.2%	13.6%	15.0%	16.3%	17.7%	19.1%	20.4%	21.8%	23.1%	24.4%	25.7%	23.8%
1977	2.9%	4.9%	7.0%	9.1%	11.3%	13.4%	15.6%	17.9%	20.2%	22.5%	24.9%	-7.2%
1978	4.9%	6.9%	8.9%	11.0%	13.1%	15.2%	17.3%	19.5%	21.6%	23.8%	26.0%	6.6%
1979	7.0%	8.4%	9.8%	11.3%	12.7%	14.1%	15.5%	16.9%	18.4%	19.8%	21.2%	18.4%
1980	7.2%	9.6%	11.9%	14.2%	16.6%	18.9%	21.2%	23.5%	25.9%	28.2%	30.5%	32.4%
1981	10.8%	10.3%	9.8%	9.3%	8.8%	8.3%	7.8%	7.3%	6.7%	6.2%	5.6%	-4.9%
1982	27.0%	25.2%	23.3%	21.4%	19.6%	17.7%	15.9%	14.1%	12.3%	10.5%	8.7%	21.4%
1983	8.7%	10.9%	13.2%	15.5%	17.9%	20.3%	22.7%	25.1%	27.7%	30.2%	32.8%	22.5%
1984	14.5%	13.9%	13.2%	12.5%	11.8%	11.1%	10.3%	9.6%	8.8%	8.0%	7.3%	6.3%
1985	19.4%	21.5%	23.7%	25.8%	28.0%	30.3%	32.5%	34.8%	37.2%	39.5%	41.9%	32.2%
1986	14.9%	16.4%	18.0%	19.5%	21.1%	22.7%	24.2%	25.8%	27.4%	29.0%	30.6%	18.5%
1987	4.5%	5.9%	7.3%	8.6%	9.9%	11.1%	12.2%	13.2%	14.2%	15.0%	15.8%	5.2%
1988	6.9%	8.9%	10.9%	12.9%	14.9%	17.0%	19.1%	21.2%	23.4%	25.6%	27.8%	16.8%
1989	13.3%	14.5%	15.6%	16.7%	17.9%	19.0%	20.1%	21.2%	22.3%	23.5%	24.6%	31.5%
1990	9.7%	6.9%	4.2%	1.5%	-1.2%	-3.8%	-6.3%	-8.9%	-11.4%	-13.8%	-16.2%	-3.1%
1991	14.9%	16.0%	17.0%	18.0%	19.0%	20.0%	20.9%	21.9%	22.8%	23.7%	24.6%	30.5%
1992	7.0%	7.8%	8.6%	9.4%	10.2%	11.0%	11.8%	12.6%	13.4%	14.2%	15.0%	7.8%
1993	10.0%	12.0%	13.9%	15.9%	17.9%	19.9%	22.0%	24.1%	26.2%	28.3%	30.4%	10.1%
1994	-3.4%	-2.7%	-2.0%	-1.3%	-0.6%	0.0%	0.7%	1.4%	2.1%	2.8%	3.5%	1.3%
1995	15.5%	15.6%	15.7%	15.8%	15.9%	16.0%	16.1%	16.2%	16.3%	16.3%	16.3%	37.6%
1996	3.4%	4.5%	5.6%	6.7%	7.8%	8.9%	10.1%	11.2%	12.3%	13.5%	14.6%	23.0%
1997	6.7%	6.7%	6.7%	6.7%	6.6%	6.6%	6.5%	6.4%	6.3%	6.2%	6.1%	33.4%
1998	8.0%	7.9%	7.8%	7.7%	7.5%	7.3%	7.0%	6.7%	6.3%	5.8%	5.3%	28.6%
1999	0.5%	2.5%	4.6%	6.7%	8.8%	10.9%	13.1%	15.3%	17.5%	19.8%	22.0%	21.0%
2000	11.3%	10.0%	8.7%	7.4%	6.1%	4.8%	3.5%	2.2%	0.9%	-0.4%	-1.6%	-9.1%
2001	7.9%	7.0%	6.2%	5.3%	4.4%	3.4%	2.4%	1.4%	0.4%	-0.7%	-1.8%	-11.9%
2002	11.4%	9.5%	7.6%	5.6%	3.7%	1.7%	-0.2%	-2.2%	-4.1%	-6.1%	-8.1%	22.1%
2003	3.4%	7.4%	11.5%	15.7%	20.0%	24.5%	29.1%	33.8%	38.7%	43.7%	48.9%	28.7%
2004	3.1%	5.1%	7.1%	9.4%	11.6%	13.8%	16.0%	18.2%	20.5%	22.8%	25.2%	10.9%
2005	1.7%	3.0%	4.3%	5.6%	6.9%	8.1%	9.4%	10.7%	12.0%	13.3%	14.6%	4.9%
2006	2.8%	5.0%	7.2%	9.4%	11.6%	13.9%	16.2%	18.5%	20.9%	23.3%	25.7%	15.8%
2007	9.6%	9.1%	8.5%	8.0%	7.4%	6.8%	6.2%	5.5%	4.9%	4.2%	3.5%	5.5%
2008	8.3%	2.4%	-3.3%	-8.7%	-13.9%	-19.0%	-23.8%	-28.4%	-32.9%	-37.1%	-41.2%	-37.0%
2009	1.1%	4.9%	8.6%	12.4%	16.2%	20.1%	23.9%	27.8%	31.7%	35.5%	39.4%	26.5%
2010	5.6%	7.3%	9.1%	10.7%	12.4%	14.0%	15.5%	17.0%	18.5%	19.9%	21.3%	15.1%
2011	7.7%	6.1%	4.5%	2.9%	1.2%	-0.5%	-2.1%	-3.8%	-5.5%	-7.2%	-9.0%	2.1%
2012	2.4%	4.1%	5.8%	7.5%	9.2%	10.9%	12.6%	14.3%	16.0%	17.7%	19.4%	16.0%
2013	-3.6%	-1.0%	1.7%	4.4%	7.2%	10.1%	13.0%	16.0%	19.0%	22.1%	25.3%	32.4%
2014	2.3%	2.5%	2.6%	2.8%	3.0%	3.1%	3.2%	3.3%	3.4%	3.5%	3.5%	13.7%
2015	0.8%	0.6%	0.3%	0.0%	-0.2%	-0.5%	-0.9%	-1.2%	-1.5%	-1.9%	-2.2%	1.4%
2016	2.1%	3.3%	4.4%	5.6%	6.7%	7.8%	8.9%	10.0%	11.1%	12.2%	13.3%	12.0%
2017	1.6%	3.4%	5.2%	7.0%	8.9%	10.8%	12.8%	14.7%	16.7%	18.7%	20.8%	21.8%
2018	0.8%	-0.7%	-2.1%	-3.5%	-4.9%	-6.4%	-7.8%	-9.2%	-10.7%	-12.1%	-13.5%	-4.4%
2019	7.6%	9.1%	10.6%	12.1%	13.6%	15.1%	16.5%	18.0%	19.4%	20.9%	22.3%	31.5%
2020	8.3%	8.5%	8.6%	8.5%	8.4%	8.2%	7.9%	7.3%	6.8%	6.1%	5.3%	18.4%
2021	1.1%	3.2%	5.4%	7.6%	9.9%	12.1%	14.4%	16.7%	19.1%	21.5%	23.9%	28.7%
2022	-9.9%	-10.1%	-10.2%	-10.4%	-10.6%	-10.8%	-11.0%	-11.3%	-11.6%	-11.9%	-12.2%	-18.1%
2023	4.3%	5.6%	6.8%	8.1%	9.4%	10.7%	12.0%	13.2%	14.5%	15.8%	17.0%	26.3%
Annualized Return	6.7%	7.3%	7.9%	8.5%	9.1%	9.6%	10.1%	10.6%	11.1%	11.5%	11.9%	10.7%
Standard Deviation	6.1%	5.9%	6.3%	7.2%	8.4%	9.9%	11.4%	13.0%	14.7%	16.4%	18.2%	17.1%
Worst 6 Months	-7.6%	-8.8%	-10.1%	-15.4%	-20.8%	-25.9%	-30.7%	-35.4%	-39.8%	-43.9%	-47.9%	-41.8%
Worst 12 Months	-10.5%	-11.2%	-11.9%	-16.8%	-22.5%	-27.8%	-32.9%	-37.7%	-42.3%	-46.6%	-50.6%	-43.3%
Worst 36 Mo (An'ltd)	-3.0%	-1.6%	-0.3%	-0.9%	-3.3%	-5.7%	-8.1%	-10.5%	-12.9%	-15.3%	-17.7%	-16.1%
Worst 60 Mo Annualized	0.3%	1.3%	1.6%	1.8%	1.4%	0.5%	-0.3%	-1.2%	-2.2%	-3.2%	-4.2%	-6.8%
Worst Drawdown	-6.1%	-5.3%	-11.3%	-17.2%	-23.5%	-30.5%	-37.0%	-42.9%	-48.4%	-53.4%	-58.0%	-50.9%

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Annualized WW Ultimate Buy & Hold  
Portfolio Risk & Return vs. Bond %



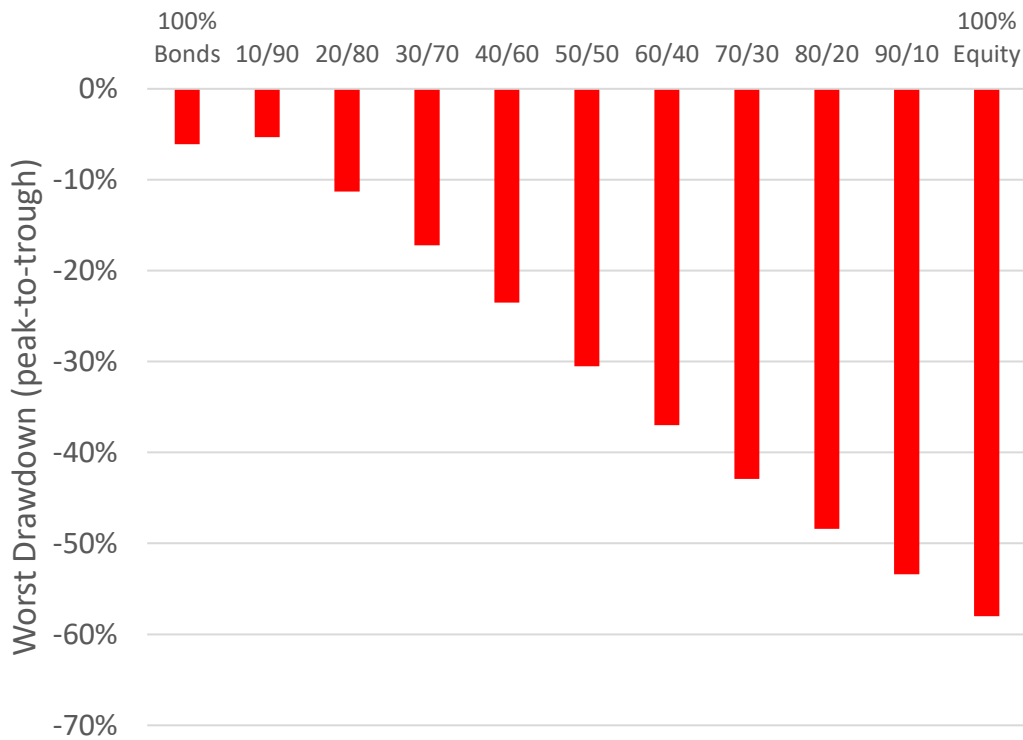


# Diversifying with Fixed Income (Bonds)

Table B2a - Fine Tuning Table: WW UBH Equity Portfolio (50% US/50% Int'l)													
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.													
Year	100% Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	100% Equity	S&P 500 Index	
1970	15.4%	14.1%	12.8%	11.5%	10.2%	8.9%	7.5%	6.2%	4.8%	3.5%	2.1%	4.0%	
1971	8.3%	10.4%	12.4%	14.5%	16.6%	18.7%	20.8%	22.9%	25.1%	27.2%	29.4%	14.3%	
1972	5.6%	7.4%	9.2%	11.0%	12.9%	14.8%	16.7%	18.6%	20.5%	22.5%	24.4%	19.0%	
1973	6.0%	4.0%	2.1%	0.1%	-1.8%	-3.8%	-5.7%	-7.6%	-9.5%	-11.3%	-13.2%	-14.7%	
1974	7.0%	2.7%	-1.5%	-5.5%	-9.4%	-13.2%	-16.9%	-20.4%	-23.9%	-27.2%	-30.4%	-26.5%	
1975	9.5%	13.0%	16.5%	20.0%	23.6%	27.2%	30.9%	34.7%	38.5%	42.3%	46.2%	37.2%	
1976	12.2%	13.6%	15.0%	16.3%	17.7%	19.1%	20.4%	21.8%	23.1%	24.4%	25.7%	23.8%	
1977	2.9%	4.9%	7.0%	9.1%	11.3%	13.4%	15.6%	17.9%	20.2%	22.5%	24.9%	-7.2%	
1978	4.9%	6.9%	8.9%	11.0%	13.1%	15.2%	17.3%	19.5%	21.6%	23.8%	26.0%	6.6%	
1979	7.0%	8.4%	9.8%	11.3%	12.7%	14.1%	15.5%	16.9%	18.4%	19.8%	21.2%	18.4%	
1980	7.2%	9.6%	11.9%	14.2%	16.6%	18.9%	21.2%	23.5%	25.9%	28.2%	30.5%	32.4%	
1981	10.8%	10.3%	9.8%	9.3%	8.8%	8.3%	7.8%	7.3%	6.7%	6.2%	5.6%	-4.9%	
1982	27.0%	25.2%	23.3%	21.4%	19.6%	17.7%	15.9%	14.1%	12.3%	10.5%	8.7%	21.4%	
1983	8.7%	10.9%	13.2%	15.5%	17.9%	20.3%	22.7%	25.1%	27.7%	30.2%	32.8%	22.5%	
1984	14.5%	13.9%	13.2%	12.5%	11.8%	11.1%	10.3%	9.6%	8.8%	8.0%	7.3%	6.3%	
1985	19.4%	21.5%	23.7%	25.8%	28.0%	30.3%	32.5%	34.8%	37.2%	39.5%	41.9%	32.2%	
1986	14.9%	16.4%	18.0%	19.5%	21.1%	22.7%	24.2%	25.8%	27.4%	29.0%	30.6%	18.5%	
1987	4.5%	5.9%	7.3%	8.6%	9.9%	11.1%	12.2%	13.2%	14.2%	15.0%	15.8%	5.2%	
1988	6.9%	8.9%	10.9%	12.9%	14.9%	17.0%	19.1%	21.2%	23.4%	25.6%	27.8%	16.8%	
1989	13.3%	14.5%	15.6%	16.7%	17.9%	19.0%	20.1%	21.2%	22.3%	23.5%	24.6%	31.5%	
1990	9.7%	6.9%	4.2%	1.5%	-1.2%	-3.8%	-6.3%	-8.9%	-11.4%	-13.8%	-16.2%	-3.1%	
1991	14.9%	16.0%	17.0%	18.0%	19.0%	20.0%	20.9%	21.9%	22.8%	23.7%	24.6%	30.5%	
1992	7.0%	6.0%	6.2%	5.8%	4.5%	4.9%	4.3%	4.1%	3.6%	3.2%	2.7%	7.8%	
1993	10.0%	12.0%	13.9%	15.9%	17.9%	19.9%	22.0%	24.1%	26.2%	28.3%	30.4%	10.1%	
1994	-3.4%	-2.7%	-2.0%	-1.3%	-0.6%	0.0%	0.7%	1.4%	2.1%	2.8%	3.5%	1.3%	
1995	15.5%	15.6%	15.7%	15.8%	15.9%	16.0%	16.1%	16.2%	16.2%	16.3%	16.3%	37.6%	
1996	3.4%	4.5%	5.6%	6.7%	7.8%	8.9%	10.1%	11.2%	12.3%	13.5%	14.6%	23.0%	
1997	6.7%	6.7%	6.7%	6.7%	6.6%	6.6%	6.5%	6.4%	6.3%	6.2%	6.1%	33.4%	
1998	8.0%	7.9%	7.8%	7.7%	7.5%	7.3%	7.0%	6.7%	6.3%	5.8%	5.3%	28.6%	
1999	0.5%	2.5%	4.6%	6.7%	8.8%	10.9%	13.1%	15.3%	17.5%	19.8%	22.0%	21.0%	
2000	11.3%	10.0%	8.7%	7.4%	6.1%	4.8%	3.5%	2.2%	0.9%	-0.4%	-1.6%	-9.1%	
2001	7.9%	7.0%	6.2%	5.3%	4.4%	3.4%	2.4%	1.4%	0.4%	-0.7%	-1.8%	-11.9%	
2002	11.4%	9.5%	7.6%	5.6%	3.7%	1.7%	-0.2%	-2.2%	-4.1%	-6.1%	-8.1%	22.1%	
2003	3.4%	7.4%	11.5%	15.7%	20.0%	24.5%	29.1%	33.8%	38.7%	43.7%	48.9%	28.7%	
2004	3.1%	5.1%	7.1%	9.4%	11.6%	13.8%	16.0%	18.2%	20.5%	22.8%	25.2%	10.9%	
2005	1.7%	3.0%	4.3%	5.6%	6.9%	8.1%	9.4%	10.7%	12.0%	13.3%	14.6%	4.9%	
2006	2.8%	5.0%	7.2%	9.4%	11.6%	13.9%	16.2%	18.5%	20.9%	23.3%	25.7%	15.8%	
2007	9.6%	9.1%	8.5%	8.0%	7.4%	6.8%	6.2%	5.5%	4.9%	4.2%	3.5%	5.5%	
2008	8.3%	2.4%	-3.3%	-8.7%	-13.9%	-19.0%	-23.8%	-28.4%	-32.9%	-37.1%	-41.2%	-37.0%	
2009	1.1%	4.9%	8.6%	12.4%	16.2%	20.1%	23.9%	27.8%	31.7%	35.5%	39.4%	26.5%	
2010	5.6%	7.3%	9.1%	10.7%	12.4%	14.0%	15.5%	17.0%	18.5%	19.9%	21.3%	15.1%	
2011	7.7%	6.1%	4.5%	2.9%	1.2%	-0.5%	-2.1%	-3.8%	-5.5%	-7.2%	-9.0%	2.1%	
2012	2.4%	4.1%	5.8%	7.5%	9.2%	10.9%	12.6%	14.3%	16.0%	17.7%	19.4%	16.0%	
2013	-3.6%	-1.0%	1.7%	4.4%	7.2%	10.1%	13.0%	16.0%	19.0%	22.1%	25.3%	32.4%	
2014	2.3%	2.5%	2.6%	2.8%	3.0%	3.1%	3.2%	3.3%	3.4%	3.5%	3.5%	13.7%	
2015	0.8%	0.6%	0.3%	0.0%	-0.2%	-0.5%	-0.9%	-1.2%	-1.5%	-1.9%	-2.2%	1.4%	
2016	2.1%	3.3%	4.4%	5.6%	6.7%	7.8%	8.9%	10.0%	11.1%	12.2%	13.3%	12.0%	
2017	1.6%	3.4%	5.2%	7.0%	8.9%	10.8%	12.8%	14.7%	16.7%	18.7%	20.8%	21.8%	
2018	0.8%	-0.7%	-2.1%	-3.5%	-4.9%	-6.4%	-7.8%	-9.2%	-10.7%	-12.1%	-13.5%	-4.4%	
2019	7.6%	9.1%	10.6%	12.1%	13.6%	15.1%	16.5%	18.0%	19.4%	20.9%	22.3%	31.5%	
2020	8.3%	8.5%	8.6%	8.5%	8.4%	8.2%	7.8%	7.3%	6.8%	6.1%	5.3%	18.4%	
2021	1.1%	3.2%	5.4%	7.6%	9.9%	12.1%	14.4%	16.7%	19.1%	21.5%	23.9%	28.7%	
2022	-9.9%	-10.1%	-10.2%	-10.4%	-10.6%	-10.8%	-11.0%	-11.3%	-11.6%	-11.9%	-12.2%	-18.1%	
2023	4.3%	5.6%	6.8%	8.1%	9.4%	10.7%	12.0%	13.2%	14.5%	15.8%	17.0%	26.3%	
Annualized Return	6.7%	7.3%	7.9%	8.5%	9.1%	9.6%	10.1%	10.6%	11.1%	11.5%	11.9%	10.7%	
Standard Deviation	6.1%	5.9%	6.3%	7.2%	8.4%	9.9%	11.4%	13.0%	14.7%	16.4%	18.2%	17.1%	
Worst 6 Months	-7.6%	-8.8%	-10.1%	-15.4%	-20.8%	-25.9%	-30.7%	-35.4%	-39.8%	-43.9%	-47.9%	-41.8%	
Worst 12 Months	-10.5%	-11.2%	-11.9%	-16.8%	-22.5%	-27.8%	-32.9%	-37.7%	-42.3%	-46.6%	-50.6%	-43.3%	
Worst 36 Mo (An'lzd)	-3.0%	-1.6%	-0.3%	-0.9%	-3.3%	-5.7%	-8.1%	-10.5%	-12.9%	-15.3%	-17.7%	-16.1%	
Worst 60 Mo Annualized	0.3%	1.3%	1.8%	1.8%	1.4%	0.5%	-0.3%	-1.2%	-2.2%	-3.2%	-4.2%	-6.6%	
Worst Drawdown	-6.1%	-3.3%	-11.3%	-17.2%	-23.5%	-30.5%	-37.0%	-42.6%	-48.4%	-53.4%	-58.0%	-50.9%	

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## WW Ultimate Buy & Hold Portfolio Worst Drawdown vs. Bond %



# Diversifying with Fixed Income (Bonds)

Table B2a - Fine Tuning Table: WW UBH Equity Portfolio (50% US/50% Int'l)													
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.													
Year	100% Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	100% Equity	S&P 500 Index	
1970	15.4%	14.1%	12.8%	11.5%	10.2%	8.9%	7.5%	6.2%	4.8%	3.5%	2.1%	4.0%	
1971	8.3%	10.4%	12.4%	14.5%	16.6%	18.7%	20.8%	22.9%	25.1%	27.2%	29.4%	14.3%	
1972	5.6%	7.4%	9.2%	11.0%	12.9%	14.8%	16.7%	18.6%	20.5%	22.5%	24.4%	19.0%	
1973	6.0%	4.0%	2.1%	0.1%	-1.8%	-3.8%	-5.7%	-7.6%	-9.5%	-11.3%	-13.2%	-14.7%	
1974	7.0%	2.7%	-1.5%	-5.5%	-9.4%	-13.2%	-16.9%	-20.4%	-23.9%	-27.2%	-30.4%	-26.5%	
1975	9.5%	13.0%	16.5%	20.0%	23.6%	27.2%	30.9%	34.7%	38.5%	42.3%	46.2%	37.2%	
1976	12.2%	13.6%	15.0%	16.3%	17.7%	19.1%	20.4%	21.8%	23.1%	24.4%	25.7%	23.8%	
1977	2.9%	4.9%	7.0%	9.1%	11.3%	13.4%	15.6%	17.9%	20.2%	22.5%	24.9%	-7.2%	
1978	4.9%	6.9%	8.9%	11.0%	13.1%	15.2%	17.3%	19.5%	21.6%	23.8%	26.0%	6.6%	
1979	7.0%	8.4%	9.8%	11.3%	12.7%	14.1%	15.5%	16.9%	18.4%	19.8%	21.2%	18.4%	
1980	7.2%	9.6%	11.9%	14.2%	16.6%	18.9%	21.2%	23.5%	25.9%	28.2%	30.5%	32.4%	
1981	10.8%	10.3%	9.8%	9.3%	8.8%	8.3%	7.8%	7.3%	6.7%	6.2%	5.6%	-4.9%	
1982	27.0%	25.2%	23.3%	21.4%	19.6%	17.7%	15.9%	14.1%	12.3%	10.5%	8.7%	21.4%	
1983	8.7%	10.9%	13.2%	15.5%	17.9%	20.3%	22.7%	25.1%	27.7%	30.2%	32.8%	22.5%	
1984	14.5%	13.9%	13.2%	12.5%	11.8%	11.1%	10.3%	9.6%	8.8%	8.0%	7.3%	6.3%	
1985	19.4%	21.5%	23.7%	25.8%	28.0%	30.3%	32.5%	34.8%	37.2%	39.5%	41.9%	32.2%	
1986	14.9%	16.4%	18.0%	19.5%	21.1%	22.7%	24.2%	25.8%	27.4%	29.0%	30.6%	18.5%	
1987	4.5%	5.9%	7.3%	8.6%	9.9%	11.1%	12.2%	13.2%	14.2%	15.0%	15.8%	5.2%	
1988	6.9%	8.9%	10.9%	12.9%	14.9%	17.0%	19.1%	21.2%	23.4%	25.6%	27.8%	16.8%	
1989	13.3%	14.5%	15.6%	16.7%	17.9%	19.0%	20.1%	21.2%	22.3%	23.5%	24.6%	31.5%	
1990	9.7%	6.9%	4.2%	1.5%	-1.2%	-3.8%	-6.3%	-8.9%	-11.4%	-13.8%	-16.2%	-3.1%	
1991	14.9%	16.0%	17.0%	18.0%	19.0%	20.0%	20.9%	21.9%	22.8%	23.7%	24.6%	30.5%	
1992	7.0%	6.8%	6.2%	5.8%	4.9%	4.3%	4.1%	3.9%	3.6%	3.2%	2.7%	7.8%	
1993	10.0%	12.0%	13.9%	15.9%	17.9%	19.9%	22.0%	24.1%	26.2%	28.3%	30.4%	10.1%	
1994	-3.4%	-2.7%	-2.0%	-1.3%	-0.6%	0.0%	0.7%	1.4%	2.1%	2.8%	3.5%	1.3%	
1995	15.5%	15.6%	15.7%	15.8%	15.9%	16.0%	16.1%	16.2%	16.2%	16.3%	16.3%	37.6%	
1996	3.4%	4.5%	5.6%	6.7%	7.8%	8.9%	10.1%	11.2%	12.3%	13.5%	14.6%	23.0%	
1997	6.7%	6.7%	6.7%	6.7%	6.6%	6.6%	6.5%	6.4%	6.3%	6.2%	6.1%	33.4%	
1998	8.0%	7.9%	7.8%	7.7%	7.5%	7.3%	7.0%	6.7%	6.3%	5.8%	5.3%	28.6%	
1999	0.5%	2.5%	4.6%	6.7%	8.8%	10.9%	13.1%	15.3%	17.5%	19.8%	22.0%	21.0%	
2000	11.3%	10.0%	8.7%	7.4%	6.1%	4.8%	3.5%	2.2%	0.9%	-0.4%	-1.6%	-9.1%	
2001	7.9%	7.0%	6.2%	5.3%	4.4%	3.4%	2.4%	1.4%	0.4%	-0.7%	-1.8%	-11.9%	
2002	11.4%	9.5%	7.6%	5.6%	3.7%	1.7%	-0.2%	-2.2%	-4.1%	-6.1%	-8.1%	22.1%	
2003	3.4%	7.4%	11.5%	15.7%	20.0%	24.5%	29.1%	33.8%	38.7%	43.7%	48.9%	28.7%	
2004	3.1%	5.1%	7.1%	9.4%	11.6%	13.8%	16.0%	18.2%	20.5%	22.8%	25.2%	10.9%	
2005	1.7%	3.0%	4.3%	5.6%	6.9%	8.1%	9.4%	10.7%	12.0%	13.3%	14.6%	4.9%	
2006	2.8%	5.0%	7.2%	9.4%	11.6%	13.9%	16.2%	18.5%	20.9%	23.3%	25.7%	15.8%	
2007	9.6%	9.1%	8.5%	8.0%	7.4%	6.8%	6.2%	5.5%	4.9%	4.2%	3.5%	5.5%	
2008	8.3%	2.4%	-3.3%	-8.7%	-13.9%	-19.0%	-23.8%	-28.4%	-32.9%	-37.1%	-41.2%	-37.0%	
2009	1.1%	4.9%	8.6%	12.4%	16.2%	20.1%	23.9%	27.8%	31.7%	35.5%	39.4%	26.5%	
2010	5.6%	7.3%	9.1%	10.7%	12.4%	14.0%	15.5%	17.0%	18.5%	19.9%	21.3%	15.1%	
2011	7.7%	6.1%	4.5%	2.9%	1.2%	-0.5%	-2.1%	-3.8%	-5.5%	-7.2%	-9.0%	2.1%	
2012	2.4%	4.1%	5.8%	7.5%	9.2%	10.9%	12.6%	14.3%	16.0%	17.7%	19.4%	16.0%	
2013	-3.6%	-1.0%	1.7%	4.4%	7.2%	10.1%	13.0%	16.0%	19.0%	22.1%	25.3%	32.4%	
2014	2.3%	2.5%	2.6%	2.8%	3.0%	3.1%	3.2%	3.3%	3.4%	3.5%	3.5%	13.7%	
2015	0.8%	0.6%	0.3%	0.0%	-0.2%	-0.5%	-0.9%	-1.2%	-1.5%	-1.9%	-2.2%	1.4%	
2016	2.1%	3.3%	4.4%	5.6%	6.7%	7.8%	8.9%	10.0%	11.1%	12.2%	13.3%	12.0%	
2017	1.6%	3.4%	5.2%	7.0%	8.9%	10.8%	12.8%	14.7%	16.7%	18.7%	20.8%	21.8%	
2018	0.8%	-0.7%	-2.1%	-3.5%	-4.9%	-6.4%	-7.8%	-9.2%	-10.7%	-12.1%	-13.5%	-4.4%	
2019	7.6%	9.1%	10.6%	12.1%	13.6%	15.1%	16.5%	18.0%	19.4%	20.9%	22.3%	31.5%	
2020	8.3%	8.5%	8.6%	8.5%	8.4%	8.2%	7.8%	7.3%	6.8%	6.1%	5.3%	18.4%	
2021	1.1%	3.2%	5.4%	7.6%	9.9%	12.1%	14.4%	16.7%	19.1%	21.5%	23.9%	28.7%	
2022	-9.9%	-10.1%	-10.2%	-10.4%	-10.6%	-10.8%	-11.0%	-11.3%	-11.6%	-11.9%	-12.2%	-18.1%	
2023	4.3%	5.6%	6.8%	8.1%	9.4%	10.7%	12.0%	13.2%	14.5%	15.8%	17.0%	26.3%	
Annualized Return	6.7%	7.3%	7.9%	8.5%	9.1%	9.6%	10.1%	10.6%	11.1%	11.5%	11.9%	10.7%	
Standard Deviation	6.1%	5.9%	6.3%	7.2%	8.4%	9.9%	11.4%	13.0%	14.7%	16.4%	18.2%	17.1%	
Worst 6 Months	-7.6%	-8.8%	-10.1%	-15.4%	-20.8%	-25.9%	-30.7%	-35.4%	-39.8%	-43.9%	-47.9%	-41.8%	
Worst 12 Months	-10.5%	-11.2%	-11.9%	-16.8%	-22.5%	-27.8%	-32.9%	-37.7%	-42.3%	-46.6%	-50.6%	-43.3%	
Worst 36 Mo (An'ltd)	-3.0%	-1.6%	-0.3%	-0.9%	-3.3%	-5.7%	-8.1%	-10.5%	-12.9%	-15.3%	-17.7%	-16.1%	
Worst 60 Mo Annualized	0.3%	1.3%	1.8%	1.8%	1.4%	0.5%	-0.3%	-1.2%	-2.2%	-3.2%	-4.2%	-6.8%	
Worst Drawdown	-6.1%	-5.3%	-11.3%	-17.2%	-23.5%	-30.5%	-37.0%	-42.9%	-48.4%	-53.4%	-58.0%	-50.9%	

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Growth of \$100k Lumpsum Investment

\$45M

\$40M

\$35M

\$30M

\$25M

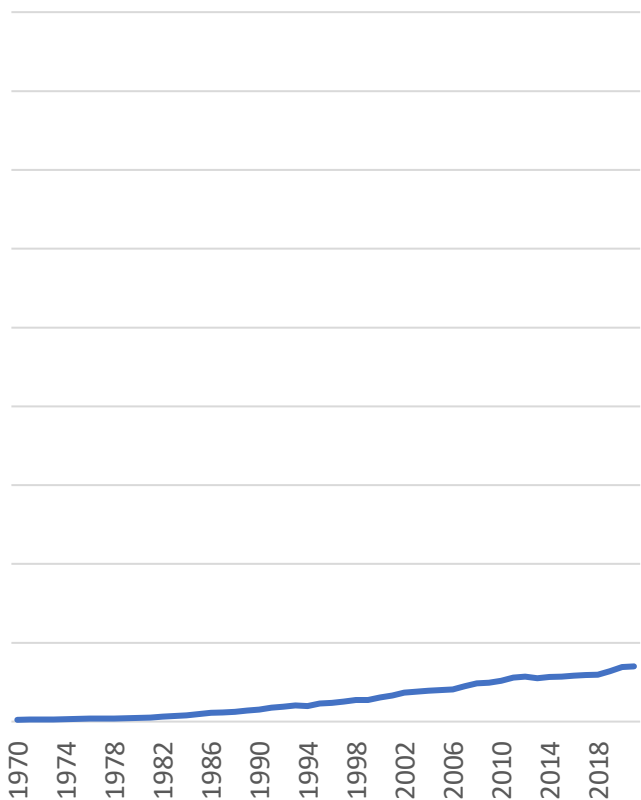
\$20M

\$15M

\$10M

\$5M

\$0M

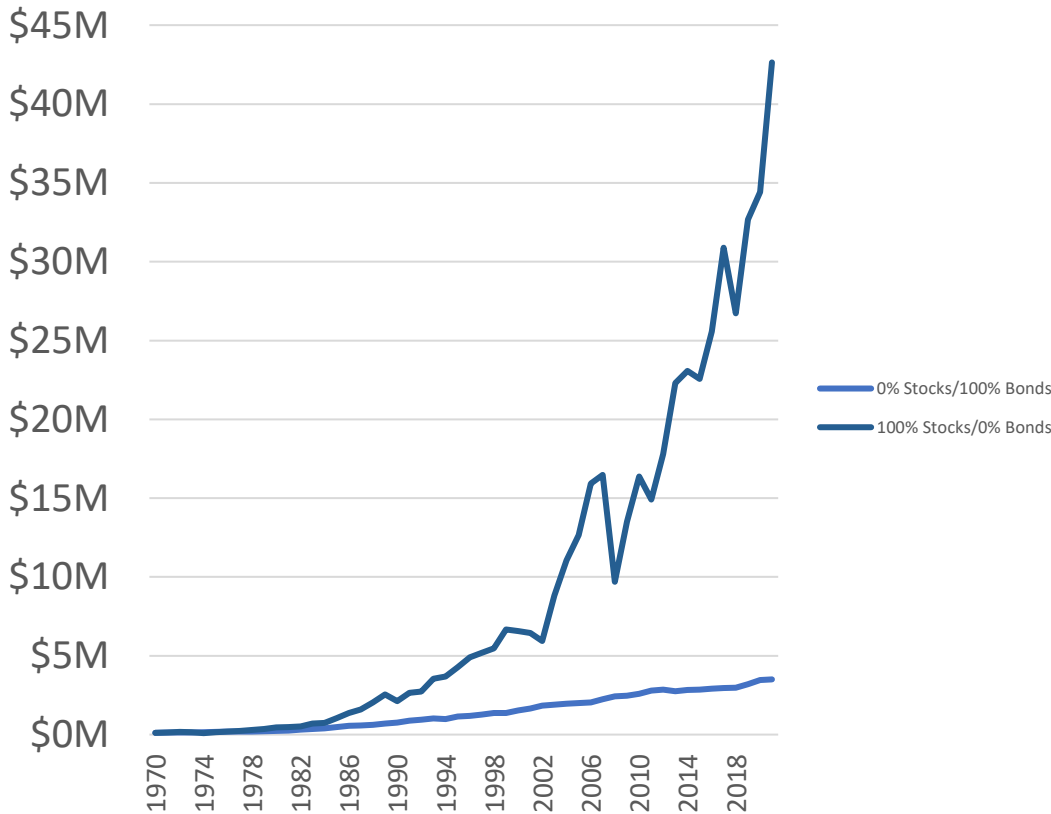


# Diversifying with Fixed Income (Bonds)

Table B2a - Fine Tuning Table: WW UBH Equity Portfolio (50% US/50% Int'l)														
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.														
Year	100% Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	100% Equity	S&P 500 Index		
1970	15.4%	14.1%	12.8%	11.5%	10.2%	8.9%	7.5%	6.2%	4.8%	3.5%	2.1%	4.0%		
1971	8.3%	10.4%	12.4%	14.5%	16.6%	18.7%	20.8%	22.9%	25.1%	27.2%	29.4%	14.3%		
1972	5.6%	7.4%	9.2%	11.0%	12.9%	14.8%	16.7%	18.6%	20.5%	22.5%	24.4%	19.0%		
1973	6.0%	4.0%	2.1%	0.1%	-1.8%	-3.8%	-5.7%	-7.6%	-9.5%	-11.3%	-13.2%	-14.7%		
1974	7.0%	2.7%	-1.5%	-5.5%	-9.4%	-13.2%	-16.9%	-20.4%	-23.9%	-27.2%	-30.4%	-26.5%		
1975	9.5%	13.0%	16.5%	20.0%	23.6%	27.2%	30.9%	34.7%	38.5%	42.3%	46.2%	37.2%		
1976	12.2%	13.6%	15.0%	16.3%	17.7%	19.1%	20.4%	21.8%	23.1%	24.4%	25.7%	23.8%		
1977	2.9%	4.9%	7.0%	9.1%	11.3%	13.4%	15.6%	17.9%	20.2%	22.5%	24.9%	-7.2%		
1978	4.9%	6.9%	8.9%	11.0%	13.1%	15.2%	17.3%	19.5%	21.6%	23.8%	26.0%	6.6%		
1979	7.0%	8.4%	9.8%	11.3%	12.7%	14.1%	15.5%	16.9%	18.4%	19.8%	21.2%	18.4%		
1980	7.2%	9.6%	11.9%	14.2%	16.6%	18.9%	21.2%	23.5%	25.9%	28.2%	30.5%	32.4%		
1981	10.8%	10.3%	9.8%	9.3%	8.8%	8.3%	7.8%	7.3%	6.7%	6.2%	5.6%	-4.9%		
1982	27.0%	25.2%	23.3%	21.4%	19.6%	17.7%	15.9%	14.1%	12.3%	10.5%	8.7%	21.4%		
1983	8.7%	10.9%	13.2%	15.5%	17.9%	20.3%	22.7%	25.1%	27.7%	30.2%	32.8%	22.5%		
1984	14.5%	13.9%	13.2%	12.5%	11.8%	11.1%	10.3%	9.6%	8.8%	8.0%	7.3%	6.3%		
1985	19.4%	21.5%	23.7%	25.8%	28.0%	30.3%	32.5%	34.8%	37.2%	39.5%	41.9%	32.2%		
1986	14.9%	16.4%	18.0%	19.5%	21.1%	22.7%	24.2%	25.8%	27.4%	29.0%	30.6%	18.5%		
1987	4.5%	5.9%	7.3%	8.6%	9.9%	11.1%	12.2%	13.2%	14.2%	15.0%	15.8%	5.2%		
1988	6.9%	8.9%	10.9%	12.9%	14.9%	17.0%	19.1%	21.2%	23.4%	25.6%	27.8%	16.8%		
1989	13.3%	14.5%	15.6%	16.7%	17.9%	19.0%	20.1%	21.2%	22.3%	23.5%	24.6%	31.5%		
1990	9.7%	6.9%	4.2%	1.5%	-1.2%	-3.8%	-6.3%	-8.9%	-11.4%	-13.8%	-16.2%	-3.1%		
1991	14.9%	16.0%	17.0%	18.0%	19.0%	20.0%	20.9%	21.9%	22.8%	23.7%	24.6%	30.5%		
1992	7.0%	6.8%	6.2%	5.8%	4.9%	4.3%	4.1%	3.8%	3.2%	2.7%	2.7%	7.8%		
1993	10.0%	12.0%	13.9%	15.9%	17.9%	19.9%	22.0%	24.1%	26.2%	28.3%	30.4%	10.1%		
1994	-3.4%	-2.7%	-2.0%	-1.3%	-0.6%	0.0%	0.7%	1.4%	2.1%	2.8%	3.5%	1.3%		
1995	15.5%	15.6%	15.7%	15.8%	15.9%	16.0%	16.1%	16.2%	16.2%	16.3%	16.3%	37.6%		
1996	3.4%	4.5%	5.6%	6.7%	7.8%	8.9%	10.1%	11.2%	12.3%	13.5%	14.6%	23.0%		
1997	6.7%	6.7%	6.7%	6.7%	6.6%	6.6%	6.5%	6.4%	6.3%	6.2%	6.1%	33.4%		
1998	8.0%	7.9%	7.8%	7.7%	7.5%	7.3%	7.0%	6.7%	6.3%	5.8%	5.3%	28.6%		
1999	0.5%	2.5%	4.6%	6.7%	8.8%	10.9%	13.1%	15.3%	17.5%	19.8%	22.0%	21.0%		
2000	11.3%	10.0%	8.7%	7.4%	6.1%	4.8%	3.5%	2.2%	0.9%	-0.4%	-1.6%	-9.1%		
2001	7.9%	7.0%	6.2%	5.3%	4.4%	3.4%	2.4%	1.4%	0.4%	-0.7%	-1.8%	-11.9%		
2002	11.4%	9.5%	7.6%	5.6%	3.7%	1.7%	-0.2%	-2.2%	-4.1%	-6.1%	-8.1%	22.1%		
2003	3.4%	7.4%	11.5%	15.7%	20.0%	24.5%	29.1%	33.8%	38.7%	43.7%	48.9%	28.7%		
2004	3.1%	5.1%	7.1%	9.4%	11.6%	13.8%	16.0%	18.2%	20.5%	22.8%	25.2%	10.9%		
2005	1.7%	3.0%	4.3%	5.6%	6.9%	8.1%	9.4%	10.7%	12.0%	13.3%	14.6%	4.9%		
2006	2.8%	5.0%	7.2%	9.4%	11.6%	13.9%	16.2%	18.5%	20.9%	23.3%	25.7%	15.8%		
2007	9.6%	9.1%	8.5%	8.0%	7.4%	6.8%	6.2%	5.5%	4.9%	4.2%	3.5%	5.5%		
2008	8.3%	2.4%	-3.3%	-8.7%	-13.9%	-19.0%	-23.8%	-28.4%	-32.9%	-37.1%	-41.2%	-37.0%		
2009	1.1%	4.9%	8.6%	12.4%	16.2%	20.1%	23.9%	27.8%	31.7%	35.5%	39.4%	26.5%		
2010	5.6%	7.3%	9.1%	10.7%	12.4%	14.0%	15.5%	17.0%	18.5%	19.9%	21.3%	15.1%		
2011	7.7%	6.1%	4.5%	2.9%	1.2%	-0.5%	-2.1%	-3.8%	-5.5%	-7.2%	-9.0%	2.1%		
2012	2.4%	4.1%	5.8%	7.5%	9.2%	10.9%	12.6%	14.3%	16.0%	17.7%	19.4%	16.0%		
2013	-3.6%	-1.0%	1.7%	4.4%	7.2%	10.1%	13.0%	16.0%	19.0%	22.1%	25.3%	32.4%		
2014	2.3%	2.5%	2.6%	2.8%	3.0%	3.1%	3.2%	3.3%	3.4%	3.5%	3.5%	13.7%		
2015	0.8%	0.6%	0.3%	0.0%	-0.2%	-0.5%	-0.9%	-1.2%	-1.5%	-1.9%	-2.2%	1.4%		
2016	2.1%	3.3%	4.4%	5.6%	6.7%	7.8%	8.9%	10.0%	11.1%	12.2%	13.3%	12.0%		
2017	1.6%	3.4%	5.2%	7.0%	8.9%	10.8%	12.8%	14.7%	16.7%	18.7%	20.8%	21.8%		
2018	0.8%	-0.7%	-2.1%	-3.5%	-4.9%	-6.4%	-7.8%	-9.2%	-10.7%	-12.1%	-13.5%	-4.4%		
2019	7.6%	9.1%	10.6%	12.1%	13.6%	15.1%	16.5%	18.0%	19.4%	20.9%	22.3%	31.5%		
2020	8.3%	8.5%	8.6%	8.5%	8.4%	8.2%	7.8%	7.3%	6.8%	6.1%	5.3%	18.4%		
2021	1.1%	3.2%	5.4%	7.6%	9.9%	12.1%	14.4%	16.7%	19.1%	21.5%	23.9%	28.7%		
2022	-9.9%	-10.1%	-10.2%	-10.4%	-10.6%	-10.8%	-11.0%	-11.3%	-11.6%	-11.9%	-12.2%	-18.1%		
2023	4.3%	5.6%	6.8%	8.1%	9.4%	10.7%	12.0%	13.2%	14.5%	15.8%	17.0%	26.3%		
Annualized Return	6.7%	7.3%	7.9%	8.5%	9.1%	9.6%	10.1%	10.6%	11.1%	11.5%	11.9%	10.7%		
Standard Deviation	6.1%	5.9%	6.3%	7.2%	8.4%	9.9%	11.4%	13.0%	14.7%	16.4%	18.2%	17.1%		
Worst 6 Months	-7.6%	-8.8%	-10.1%	-15.4%	-20.8%	-25.9%	-30.7%	-35.4%	-39.8%	-43.9%	-47.9%	-41.8%		
Worst 12 Months	-10.5%	-11.2%	-11.9%	-16.8%	-22.5%	-27.8%	-32.9%	-37.7%	-42.3%	-46.6%	-50.6%	-43.3%		
Worst 36 Mo (An'ltd)	-3.0%	-1.6%	-0.3%	-0.9%	-3.3%	-5.7%	-8.1%	-10.5%	-12.9%	-15.3%	-17.7%	-16.1%		
Worst 60 Mo Annualized	0.3%	1.3%	1.6%	1.8%	1.4%	0.5%	-0.3%	-1.2%	-2.2%	-3.2%	-4.2%	-6.8%		
Worst Drawdown	-6.1%	-5.3%	-11.3%	-17.2%	-23.5%	-30.5%	-37.0%	-42.9%	-48.4%	-53.4%	-58.0%	-50.9%		

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Growth of \$100k Lumpsum Investment



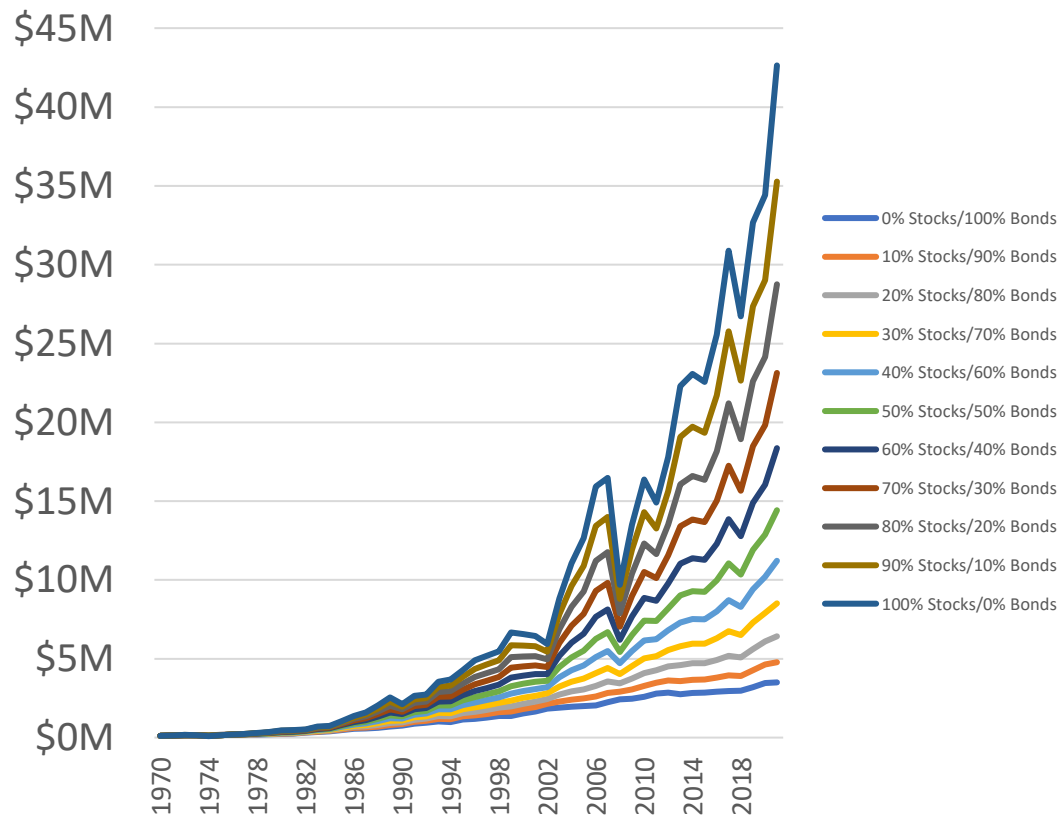


# Diversifying with Fixed Income (Bonds)

Table B2a - Fine Tuning Table: WW UBH Equity Portfolio (50% US/50% Int'l)														
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.														
Year	100% Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	100% Equity	S&P 500 Index		
1970	15.4%	14.1%	12.8%	11.5%	10.2%	8.9%	7.5%	6.2%	4.8%	3.5%	2.1%	4.0%		
1971	8.3%	10.4%	12.4%	14.5%	16.6%	18.7%	20.8%	22.9%	25.1%	27.2%	29.4%	14.3%		
1972	5.6%	7.4%	9.2%	11.0%	12.9%	14.8%	16.7%	18.6%	20.5%	22.5%	24.4%	19.0%		
1973	6.0%	4.0%	2.1%	0.1%	-1.8%	-3.8%	-5.7%	-7.6%	-9.5%	-11.3%	-13.2%	-14.7%		
1974	7.0%	2.7%	-1.5%	-5.5%	-9.4%	-13.2%	-16.9%	-20.4%	-23.9%	-27.2%	-30.4%	-26.5%		
1975	9.5%	13.0%	16.5%	20.0%	23.6%	27.2%	30.9%	34.7%	38.5%	42.3%	46.2%	37.2%		
1976	12.2%	13.6%	15.0%	16.3%	17.7%	19.1%	20.4%	21.8%	23.1%	24.4%	25.7%	23.8%		
1977	2.9%	4.9%	7.0%	9.1%	11.3%	13.4%	15.6%	17.9%	20.2%	22.5%	24.9%	-7.2%		
1978	4.9%	6.9%	8.9%	11.0%	13.1%	15.2%	17.3%	19.5%	21.6%	23.8%	26.0%	6.6%		
1979	7.0%	8.4%	9.8%	11.3%	12.7%	14.1%	15.5%	16.9%	18.4%	19.8%	21.2%	18.4%		
1980	7.2%	9.6%	11.9%	14.2%	16.6%	18.9%	21.2%	23.5%	25.9%	28.2%	30.5%	32.4%		
1981	10.8%	10.3%	9.8%	9.3%	8.8%	8.3%	7.8%	7.3%	6.7%	6.2%	5.6%	-4.9%		
1982	27.0%	25.2%	23.3%	21.4%	19.6%	17.7%	15.9%	14.1%	12.3%	10.5%	8.7%	21.4%		
1983	8.7%	10.9%	13.2%	15.5%	17.9%	20.3%	22.7%	25.1%	27.7%	30.2%	32.8%	22.5%		
1984	14.5%	13.9%	13.2%	12.5%	11.8%	11.1%	10.3%	9.6%	8.8%	8.0%	7.3%	6.3%		
1985	19.4%	21.5%	23.7%	25.8%	28.0%	30.3%	32.5%	34.8%	37.2%	39.5%	41.9%	32.2%		
1986	14.9%	16.4%	18.0%	19.5%	21.1%	22.7%	24.2%	25.8%	27.4%	29.0%	30.6%	18.5%		
1987	4.5%	5.9%	7.3%	8.6%	9.9%	11.1%	12.2%	13.2%	14.2%	15.0%	15.8%	5.2%		
1988	6.9%	8.9%	10.9%	12.9%	14.9%	17.0%	19.1%	21.2%	23.4%	25.6%	27.8%	16.8%		
1989	13.3%	14.5%	15.6%	16.7%	17.9%	19.0%	20.1%	21.2%	22.3%	23.5%	24.6%	31.5%		
1990	9.7%	6.9%	4.2%	1.5%	-1.2%	-3.8%	-6.3%	-8.9%	-11.4%	-13.8%	-16.2%	-3.1%		
1991	14.9%	16.0%	17.0%	18.0%	19.0%	20.0%	20.9%	21.9%	22.8%	23.7%	24.6%	30.5%		
1992	7.0%	6.8%	6.2%	5.8%	4.9%	4.3%	4.1%	3.8%	3.2%	2.7%	2.7%	7.8%		
1993	10.0%	12.0%	13.9%	15.8%	17.9%	19.9%	22.0%	24.1%	26.2%	28.3%	30.4%	10.1%		
1994	-3.4%	-2.7%	-2.0%	-1.3%	-0.6%	0.0%	0.7%	1.4%	2.1%	2.8%	3.5%	1.3%		
1995	15.5%	15.6%	15.7%	15.8%	15.9%	16.0%	16.1%	16.2%	16.3%	16.3%	16.3%	37.6%		
1996	3.4%	4.5%	5.6%	6.7%	7.8%	8.9%	10.1%	11.2%	12.3%	13.5%	14.6%	23.0%		
1997	6.7%	6.7%	6.7%	6.7%	6.6%	6.6%	6.5%	6.4%	6.3%	6.2%	6.1%	33.4%		
1998	8.0%	7.9%	7.8%	7.7%	7.5%	7.3%	7.0%	6.7%	6.3%	5.8%	5.3%	28.6%		
1999	0.5%	2.5%	4.6%	6.7%	8.8%	10.9%	13.1%	15.3%	17.5%	19.8%	22.0%	21.0%		
2000	11.3%	10.0%	8.7%	7.4%	6.1%	4.8%	3.5%	2.2%	0.9%	-0.4%	-1.6%	-9.1%		
2001	7.9%	7.0%	6.2%	5.3%	4.4%	3.4%	2.4%	1.4%	0.4%	-0.7%	-1.8%	-11.9%		
2002	11.4%	9.5%	7.6%	5.6%	3.7%	1.7%	-0.2%	-2.2%	-4.1%	-6.1%	-8.1%	22.1%		
2003	3.4%	7.4%	11.5%	15.7%	20.0%	24.5%	29.1%	33.8%	38.7%	43.7%	48.9%	28.7%		
2004	3.1%	5.1%	7.1%	9.4%	11.6%	13.8%	16.0%	18.2%	20.5%	22.8%	25.2%	10.9%		
2005	1.7%	3.0%	4.3%	5.6%	6.9%	8.1%	9.4%	10.7%	12.0%	13.3%	14.6%	4.9%		
2006	2.8%	5.0%	7.2%	9.4%	11.6%	13.9%	16.2%	18.5%	20.9%	23.3%	25.7%	15.8%		
2007	9.6%	9.1%	8.5%	8.0%	7.4%	6.8%	6.2%	5.5%	4.9%	4.2%	3.5%	5.5%		
2008	8.3%	2.4%	-3.3%	-8.7%	-13.9%	-19.0%	-23.8%	-28.4%	-32.9%	-37.1%	-41.2%	-37.0%		
2009	1.1%	4.9%	8.6%	12.4%	16.2%	20.1%	23.9%	27.8%	31.7%	35.5%	39.4%	26.5%		
2010	5.6%	7.3%	9.1%	10.7%	12.4%	14.0%	15.5%	17.0%	18.5%	19.9%	21.3%	15.1%		
2011	7.7%	6.1%	4.5%	2.9%	1.2%	-0.5%	-2.1%	-3.8%	-5.5%	-7.2%	-9.0%	2.1%		
2012	2.4%	4.1%	5.8%	7.5%	9.2%	10.9%	12.6%	14.3%	16.0%	17.7%	19.4%	16.0%		
2013	-3.6%	-1.0%	1.7%	4.4%	7.2%	10.1%	13.0%	16.0%	19.0%	22.1%	25.3%	32.4%		
2014	2.3%	2.5%	2.6%	2.8%	3.0%	3.1%	3.2%	3.3%	3.4%	3.5%	3.5%	13.7%		
2015	0.8%	0.6%	0.3%	0.0%	-0.2%	-0.5%	-0.9%	-1.2%	-1.5%	-1.9%	-2.2%	1.4%		
2016	2.1%	3.3%	4.4%	5.6%	6.7%	7.8%	8.9%	10.0%	11.1%	12.2%	13.3%	12.0%		
2017	1.6%	3.4%	5.2%	7.0%	8.9%	10.8%	12.8%	14.7%	16.7%	18.7%	20.8%	21.8%		
2018	0.8%	-0.7%	-2.1%	-3.5%	-4.9%	-6.4%	-7.8%	-9.2%	-10.7%	-12.1%	-13.5%	-4.4%		
2019	7.6%	9.1%	10.6%	12.1%	13.6%	15.1%	16.5%	18.0%	19.4%	20.8%	22.3%	31.5%		
2020	8.3%	8.5%	8.6%	8.5%	8.4%	8.2%	7.8%	7.3%	6.8%	6.1%	5.3%	18.4%		
2021	1.1%	3.2%	5.4%	7.6%	9.9%	12.1%	14.4%	16.7%	19.1%	21.5%	23.9%	28.7%		
2022	-9.9%	-10.1%	-10.2%	-10.4%	-10.6%	-10.8%	-11.0%	-11.3%	-11.6%	-11.9%	-12.2%	-18.1%		
2023	4.3%	5.6%	6.8%	8.1%	9.4%	10.7%	12.0%	13.2%	14.5%	15.8%	17.0%	26.3%		
Annualized Return	6.7%	7.3%	7.9%	8.5%	9.1%	9.6%	10.1%	10.6%	11.1%	11.5%	11.9%	10.7%		
Standard Deviation	6.1%	5.9%	6.3%	7.2%	8.4%	9.9%	11.4%	13.0%	14.7%	16.4%	18.2%	17.1%		
Worst 6 Months	-7.6%	-8.8%	-10.1%	-15.4%	-20.8%	-25.9%	-30.7%	-35.4%	-39.8%	-43.9%	-47.9%	-41.8%		
Worst 12 Months	-10.5%	-11.2%	-11.9%	-16.8%	-22.5%	-27.8%	-32.9%	-37.7%	-42.3%	-46.6%	-50.6%	-43.3%		
Worst 36 Mo (An'lzd)	-3.0%	-1.6%	-0.3%	-0.9%	-3.3%	-5.7%	-8.1%	-10.5%	-12.9%	-15.3%	-17.7%	-16.1%		
Worst 60 Mo Annualized	0.3%	1.3%	1.6%	1.8%	1.4%	0.5%	-0.3%	-1.2%	-2.2%	-3.2%	-4.2%	-6.8%		
Worst Drawdown	-6.1%	-5.3%	-11.3%	-17.2%	-23.5%	-30.5%	-37.0%	-42.9%	-48.4%	-53.4%	-58.0%	-50.9%		

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Growth of \$100k Lumpsum Investment



# Diversifying with Fixed Income (Bonds)

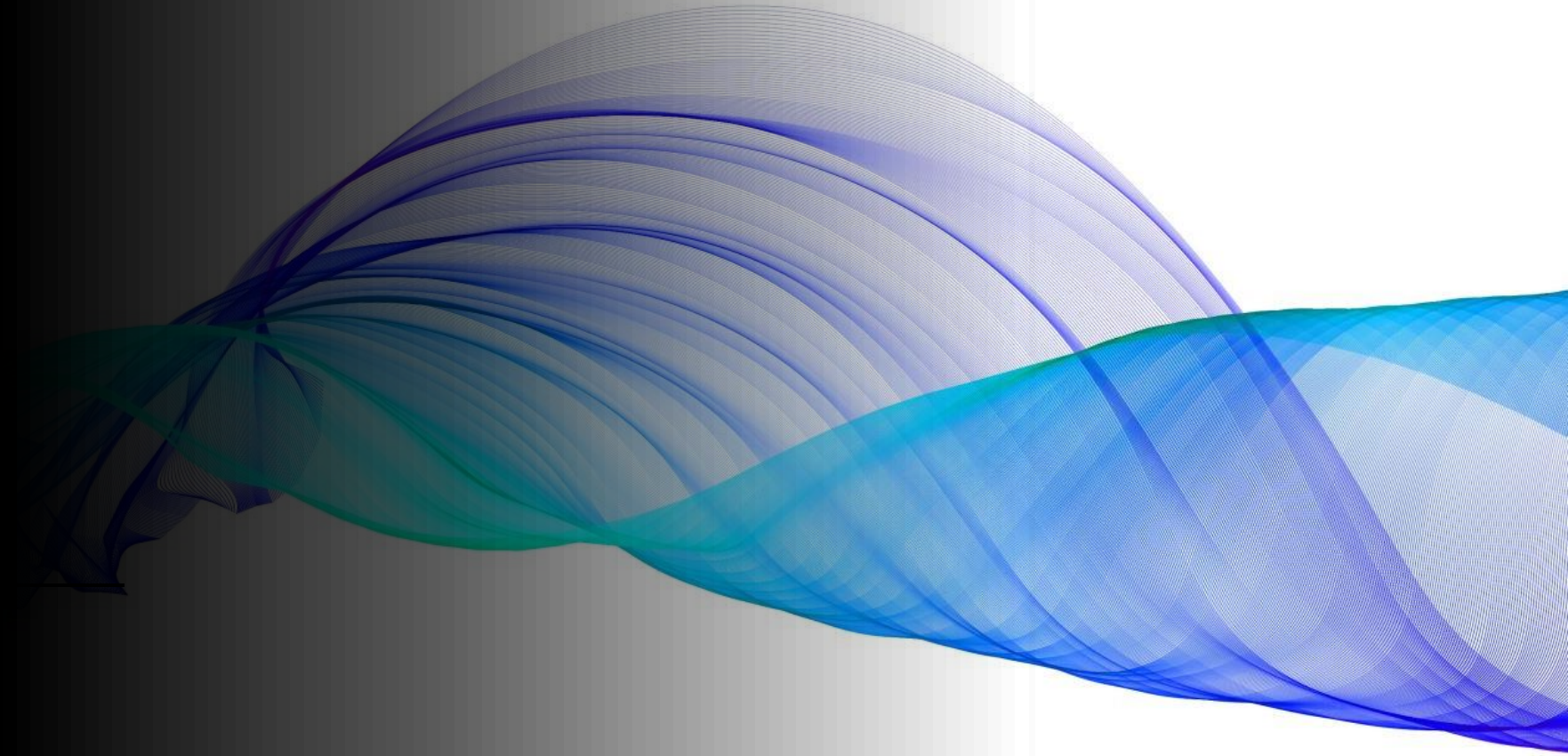
Table B1 - Fine Tuning Table: S&P 500 Equity Portfolio													
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.													
Year	Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	Equity	S&P 500 Index	
1970	15.4%	14.4%											
1971	8.3%	9.0%											
1972	5.6%	6.9%											
1973	6.0%	3.8%											
1974	7.0%	3.4%											
1975	9.5%	12.1%											
1976	12.2%	13.4%											
1977	2.9%	1.9%											
1978	4.9%	5.1%											
1979	7.0%	8.2%											
1980	7.2%	9.8%											
1981	10.8%	9.2%											
1982	27.0%	26.6%											
1983	8.7%	10.0%											
1984	14.5%	13.7%											
1985	19.4%	20.7%											
1986	14.9%	15.4%											
1987	4.5%	5.0%											
1988	6.9%	7.9%											
1989	13.3%	15.1%											
1990	9.7%	8.4%											
1991	14.9%	16.5%											
1992	7.0%	7.1%											
1993	10.0%	10.1%											
1994	-3.4%	-2.9%											
1995	15.5%	17.6%											
1996	3.4%	5.2%											
1997	6.7%	9.2%											
1998	8.0%	10.1%											
1999	0.5%	2.4%											
2000	11.3%	9.2%											
2001	7.9%	5.9%											
2002	11.4%	7.8%											
2003	3.4%	5.8%											
2004	3.1%	3.8%											
2005	1.7%	2.1%											
2006	2.8%	4.1%											
2007	9.6%	9.2%											
2008	8.3%	2.9%											
2009	1.1%	3.6%											
2010	5.6%	6.7%											
2011	7.7%	7.2%											
2012	2.4%	3.8%											
2013	-1.6%	-0.5%											
2014	2.3%	3.5%											
2015	0.8%	1.0%											
2016	2.1%	3.1%											
2017	1.6%	3.5%											
2018	0.8%	0.4%											
2019	7.6%	9.9%											
2020	8.3%	9.6%											
2021	1.1%	3.6%											
2022	-9.9%	-10.7%											
2023	4.3%	6.3%											
Annualized Return 6.7% 7.2%													
Standard Deviation 6.1% 6.0%													
Worst 6 Months -7.6% -8.8%													
Worst 12 Months -10.5% -10.9%													
Worst 36 Mo (An'lzd) -3.0% -1.6%													
Worst 60 Mos Annualized 0.3% 1.6%													
Worst Drawdown -5.1% -5.0%													
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Table B2a - Fine Tuning Table: WW UBH Equity Portfolio (50% US/50% Int'l)													
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.													
Year	Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	Equity	S&P 500 Index	
1970	15.4%	14.1%											
1971	8.3%	10.4%											
1972	5.6%	7.4%											
1973	6.0%	4.0%											
1974	7.0%	2.7%											
1975	9.5%	13.0%											
1976	12.2%	13.6%											
1977	2.9%	4.9%											
1978	4.9%	6.9%											
1979	7.0%	8.4%											
1980	7.2%	9.6%											
1981	10.8%	10.3%											
1982	27.0%	25.2%											
1983	8.7%	10.9%											
1984	14.5%	13.9%											
1985	19.4%	21.5%											
1986	14.9%	16.4%											
1987	4.5%	5.9%											
1988	6.9%	8.9%											
1989	13.3%	14.5%											
1990	9.7%	6.9%											
1991	14.9%	16.0%											
1992	7.0%	6.6%											
1993	10.0%	10.9%											
1994	-3.4%	-2.7%											
1995	15.5%	15.6%											
1996	3.4%	4.5%											
1997	6.7%	6.7%											
1998	8.0%	7.9%											
1999	0.5%	2.5%											
2000	11.3%	10.0%											
2001	7.9%	7.0%											
2002	11.4%	9.5%											
2003	3.4%	7.4%											
2004	3.1%	5.1%											
2005	1.7%	3.0%											
2006	2.8%	5.0%											
2007	9.6%	9.5%											
2008	8.3%	2.4%											
2009	1.1%	3.1%											
2010	5.6%	7.3%											
2011	7.7%	6.1%											
2012	2.4%	4.1%											
2013	-1.6%	-1.0%											
2014	2.3%	2.5%											
2015	0.8%	0.6%											
2016	2.1%	3.3%											
2017	1.6%	3.4%											
2018	0.8%	-0.7%											
2019	7.6%	8.1%											
2020	8.3%	8.5%											
2021	1.1%	3.2%											
2022	-9.9%	-10.1%											
2023	4.3%	5.6%											
Annualized Return 6.7% 7.3%													
Standard Deviation 6.1% 5.9%													
Worst 6 Months -7.6% -8.8%													
Worst 12 Months -10.5% -11.2%													
Worst 36 Mo (An'lzd) -3.0% -1.6%													
Worst 60 Mos Annualized 0.3% 1.3%													
Worst Drawdown -5.1% -5.3%													
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Table B7a - Fine Tuning Table: WW All SCV Equity Portfolio (50% US/50% Int'l)													
Index returns reduced by a representative fund's expense ratio, except S&P 500 Index shown below.													
Year	Bonds	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	Equity	S&P 500 Index	
1970	15.4%	14.5%	13.6%	12.7%	11.7%	10.7%	9.6%	8.6%	7.5%	6.4%	5.3%	4.0%	
1971	8.3%	10.8%	13.3%	15.9%	18.4%	21.0%	23.6%	26.3%	29.0%	31.7%	34.4%	14.3%	
1972	5.6%	6.8%	8.0%	9.1%	10.3%	11.5%	12.6%	13.7%	14.8%	15.9%	17.0%	19.0%	
1973	6.0%	3.6%	1.2%	-1.2%	-3.5%	-5.9%	-8.1%	-10.4%	-12.6%	-14.9%	-17.0%	-14.7%	
1974	7.0%	2.4%	-2.1%	-6.4%	-10.6%	-14.6%	-18.5%	-22.3%	-25.9%	-29.4%	-32.8%	-26.5%	
1975	9.5%	14.8%	20.3%	25.9%	31.7%	37.7%	43.8%	50.0%	56.4%	63.0%	69.7%	37.2%	
1976	12.2%	13.7%	15.2%	16.6%	18.1%	19.5%	20.8%	22.1%	23.4%	24.7%	25.9%	23.8%	
1977	2.9%	6.7%	10.7%	14.7%	18.9%	23.2%	27.3%	32.3%	37.0%	41.9%	47.0%	-7.2%	
1978	4.9%	7.5%	10.1%	12.7%	15.4%	18.2%	21.0%	23.6%	26.2%	28.8%	32.6%	6.6%	
1979	7.0%	8.9%	10.9%	12.8%	14.8%	16.7%	18.7%	20.7%	22.7%	24.8%	26.8%	18.4%	
1980	7.2%	9.3%	11.3%	13.3%	15.3%	17.3%	19.3%	21.3%	23.2%	25.1%	27.0%	32.4%	
1981	10.8%	11.6%	12.5%	13.3%	14.1%	14.9%	15.7%	16.6%	17.4%	18.1%	18.9%	-4.9%	
1982	27.0%	25.9%	24.8%	23.7%	22.6%	21.5%	20.4%	19.2%	18.1%	16.9%	15.8%	21.4%	
1983	8.7%	11.8%	14.9%	18.1%	21.4%	24.8%	28.2%	31.8%	35.4%	39.1%	42.8%	22.5%	
1984	14.5%	13.8%	13.0%	12.3%	11.5%	10.7%	9.9%	9.1%	8.3%	7.5%	6.6%	6.3%	
1985	19.4%	22.2%	25.1%	28.1%	31.1%	34.1%	37.2%	40.4%	43.6%	46.9%	50.3%	32.2%	
1986	14.9%	16.5%	18.0%	19.6%	21.2%	22.8%	24.4%	25.9%	27.5%	29.1%	30.8%	18.8%	
1987	4.5%	6.4%	8.3%	10.2%	11.9%	13.7%	15.5%	16.8%	18.3%	19.6%	20.8%	5.2%	
1988	6.9%	9.4%	11.9%	14.4%	16.9%	19.4%	21.9%	24.4%	26.9%	29.4%	31.9%	16.1%	
1989	13.3%	14.5%	15.7%	16.9%	18.1%	19.3%	20.5%	21.7%	22.9%	24.0%	25.2%	31.5%	
1990	9.7%	6.4%	3.2%	0.0%	-3.0%	-6.1%	-9.0%	-12.0%	-14.8%	-17.6%	-20.4%	-3.1%	
1991	14.9%	16.0%	17.0%	18.1%	19.1%	20.0%	21.0%	21.9%	22.8%	23.7%	24.6%	30.5%	
1992	7.0%	6.9%	6.8%	6.6%	6.4%	6.3%	6.1%	5.9%	5.7%	5.4%	5.4%	7.6%	
1993	10.0%	12.3%	14.5%	16.7%	18.9%	21.3%	23.7%	26.0%	28.4%	30.8%	33.2%	10.1%	
1994	-3.4%	-2.2%	-1.0%	0.2%	1.5%	2.7%	3.9%	5.2%	6.4%	7.7%	8.9%	1.3%	
1995	15.5%	15.5%	15.4%	15.3%	15.2%	15.1%	15.0%	14.9%	14.8%	14.7%	14.6%	37.6%	
1996	3.4%	4.2%	5.0%	5.8%	6.6%	7.4%	8.2%	8.9%	9.7%	10.5%	11.3%	23.0%	
1997	6.7%	6.2%	5.7%	5.1%	4.6%	4.0%							



# Simplicity vs. Complexity





# Merriman Sound Investing Portfolios

## Sound Investing Portfolios - Asset Allocations (Worldwide (WW) portfolios: 50% US / 50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt
S&P 500	100%									
WW UBH	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
WW 4-Fund	25%			25%			25%	25%		
US 4-Fund	25%	25%	25%	25%						
WW All Value		25%		25%			20%		20%	10%
US All Value		50%		50%						
WW All SCV				50%					50%	
US All SCV				100%						
US 2-Fund	50%			50%						

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LCV = Large-Cap Value, SCB = Small-Cap Value, REIT = Real Estate Investment Trust, LCB = Large-Cap Blend, UBH = Ultimate Buy & Hold

# Merriman Sound Investing Portfolios

## Half Large, Half Small, Half Blend, Half Value

**Sound Investing Portfolios - Asset Allocations** (Worldwide (WW) portfolios: 50% US / 50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt	Annual Return	Worst Drawdown
<b>S&amp;P 500</b>	100%											
<b>WW UBH</b>	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	11.8%	-41.2%
<b>WW 4-Fund</b>	25%			25%			25%	25%			11.9%	-40.9%
<b>US 4-Fund</b>	25%	25%	25%	25%							12.0%	-37.6%
<b>WW All Value</b>		25%		25%			20%		20%	10%		
<b>US All Value</b>		50%		50%								
<b>WW All SCV</b>				50%					50%			
<b>US All SCV</b>				100%								
<b>US 2-Fund</b>	50%			50%							12.2%	-36.8%

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LCV = Large-Cap Value, SCB = Small-Cap Value, REIT = Real Estate Investment Trust, LCB = Large-Cap Blend, UBH = Ultimate Buy & Hold

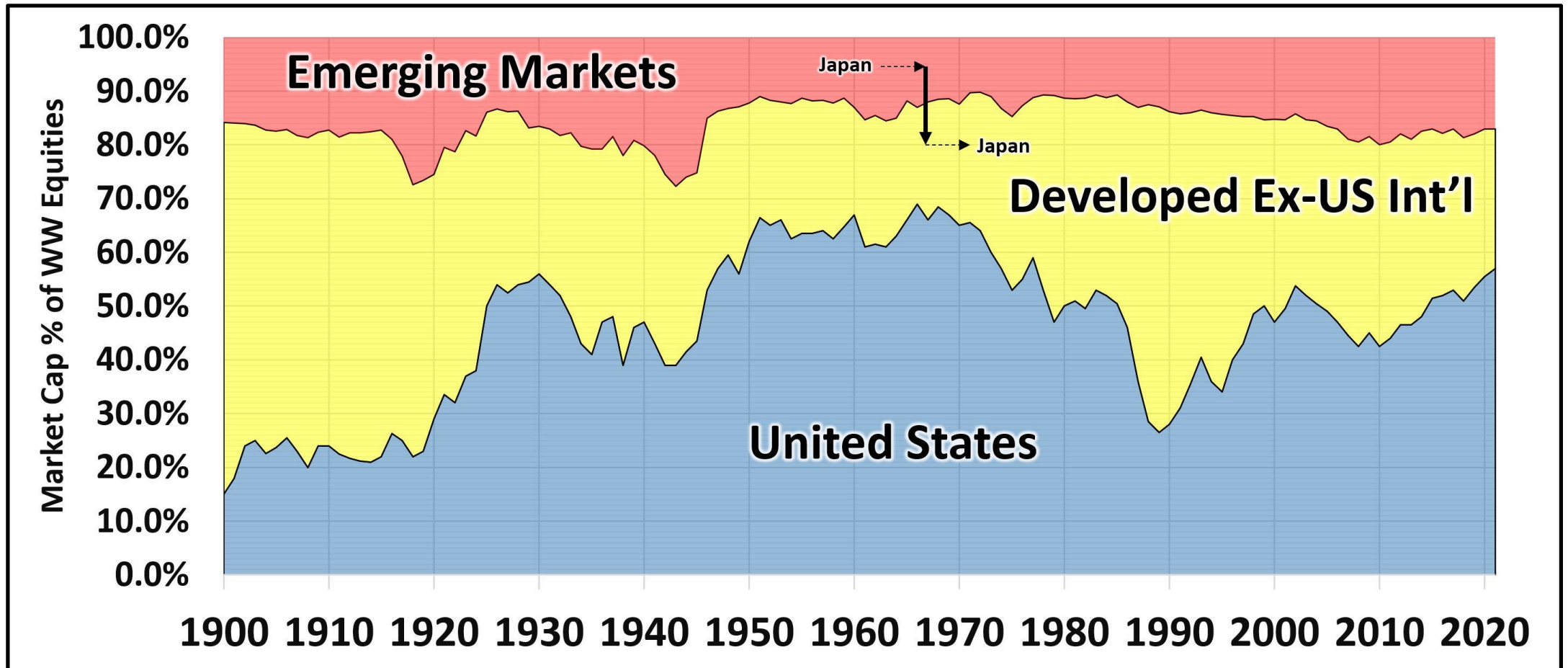
# Merriman Sound Investing Portfolios

## Half Large, Half Small, Half Blend, Half Value

**Sound Investing Portfolios - Asset Allocations** (Worldwide (WW) portfolios: 50% US / 50% Int'l)

Portfolio	S&P 500	US LCV	US SCB	US SCV	REIT	Intl LCB	Intl LCV	Intl SCB	Intl SCV	Em Mrkt	Annual Return	Worst Drawdown
<b>S&amp;P 500</b>	100%											
<b>WW UBH</b>	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	11.8%	-41.2%
<b>WW 4-Fund</b>	25%			25%			25%	25%			11.9%	-40.9%
<b>US 4-Fund</b>	25%	25%	25%	25%							12.0%	-37.6%
<b>WW All Value</b>		25%		25%			20%		20%	10%		
<b>US All Value</b>		50%		50%								
<b>WW All SCV</b>				50%					50%			
<b>US All SCV</b>				100%								
<b>US 2-Fund</b>	50%			50%							12.2%	-36.8%
© 2023 The Merriman Financial Education Foundation												
<b>2 Funds for Life -- 50% Vanguard-Like Target-Date Fund, 50% US Small-Cap Value (25 Years or More Before Retirement)</b>											12.1%	-41.0%

LCV = Large-Cap Value, SCB = Small-Cap Value, REIT = Real Estate Investment Trust, LCB = Large-Cap Blend, UBH = Ultimate Buy & Hold



Geographic diversification is a hedge,  
not a factor



# Implications for Accumulators & Retirees



# Scenarios for Accumulators & Retirees

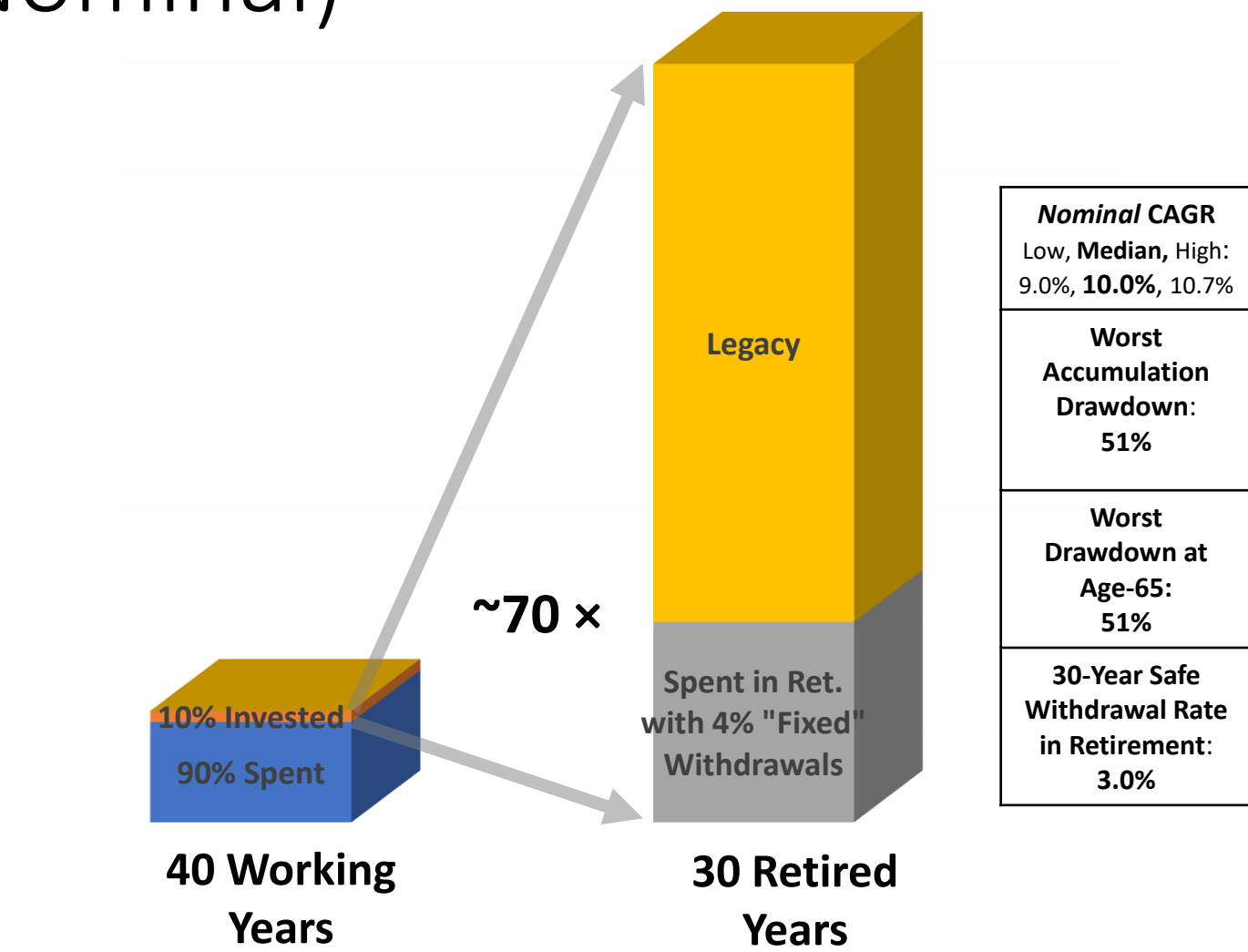
Real-world investors add time diversification

- Dollar-cost averaging contributions
- Dollar-sale averaging withdrawals

Lifetime Scenario for Modeling

- 40-years of accumulation at 10% savings rate
- 30-years of retirement withdrawals
  - 4% “Fixed”
  - Take 4% of portfolio out in year 1
  - Increase withdrawal by inflation in future years

# Just the S&P 500 (Nominal)

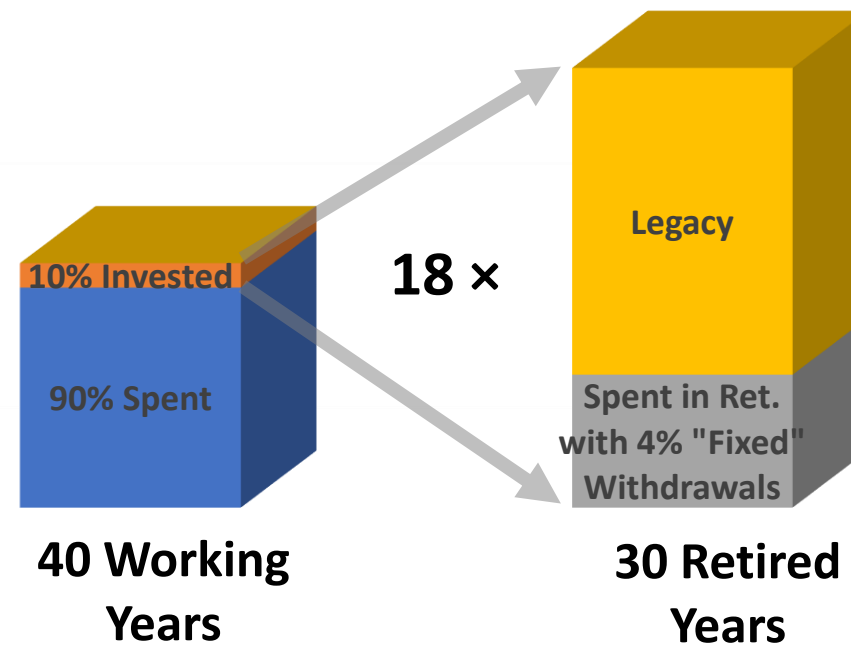


**Compressed Scale Compared to Other Charts**

Backtested with monthly contributions, annual withdrawals, annual rebalancing, circular bootstrapping & monthly start dates from Jan. 1970 through Dec. 2022 for CAGRs & drawdowns. Safe-withdrawal rates tested back to Jan. 1928.

# Just the S&P 500 (*Real*)

- + Tracks the market
- + Historically very effective
- High volatility throughout
- Worst drawdowns are most likely in retirement
- Legacy >> spending
- Only 3% Safe Withdrawal Rate



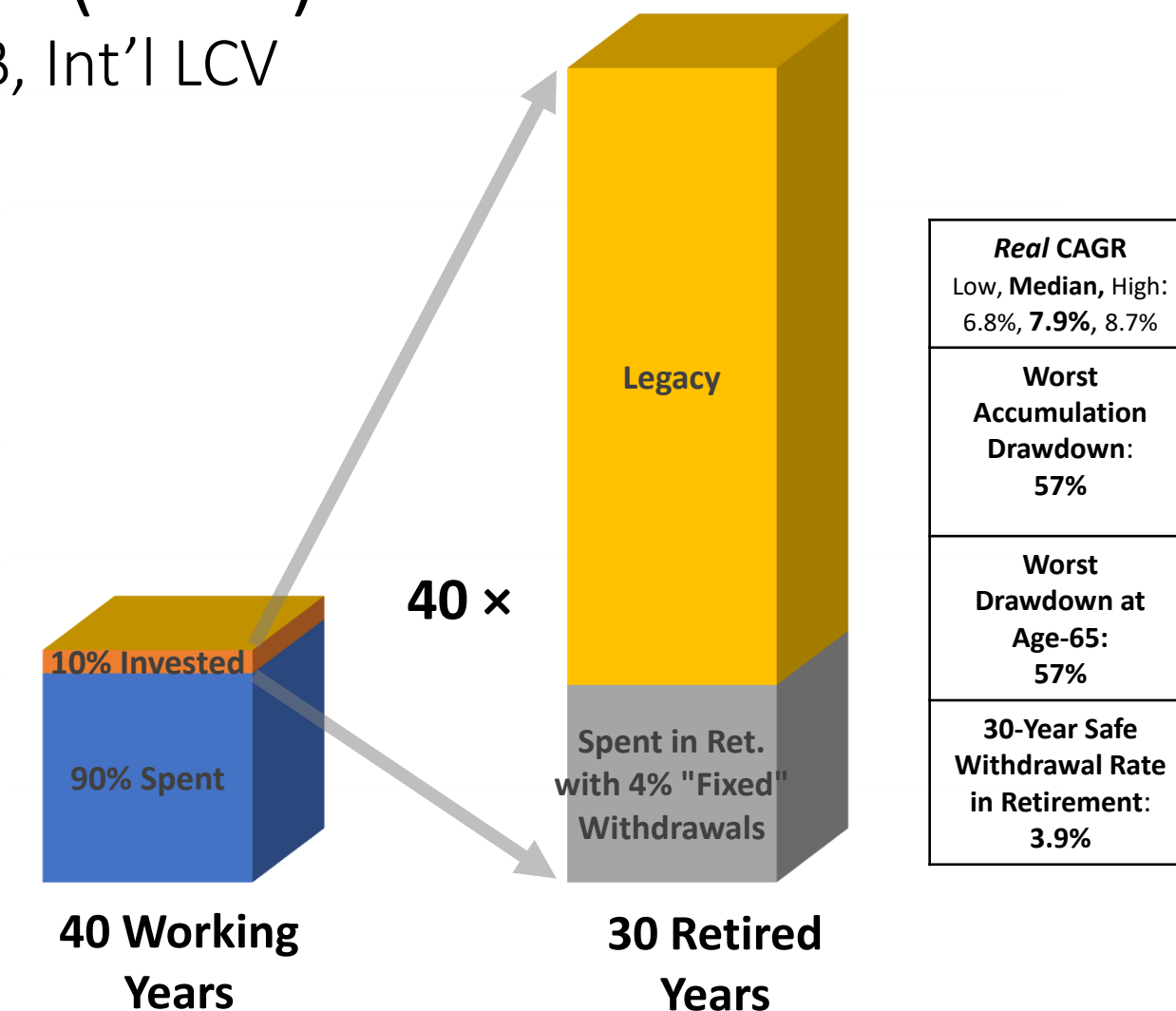
<b>Real CAGR</b> Low, Median, High: 4.8%, 5.9%, 6.6%
<b>Worst Accumulation Drawdown:</b> 51%
<b>Worst Drawdown at Age-65:</b> 51%
<b>30-Year Safe Withdrawal Rate in Retirement:</b> 3.0%



# Merriman WW 4-Fund (*Real*)

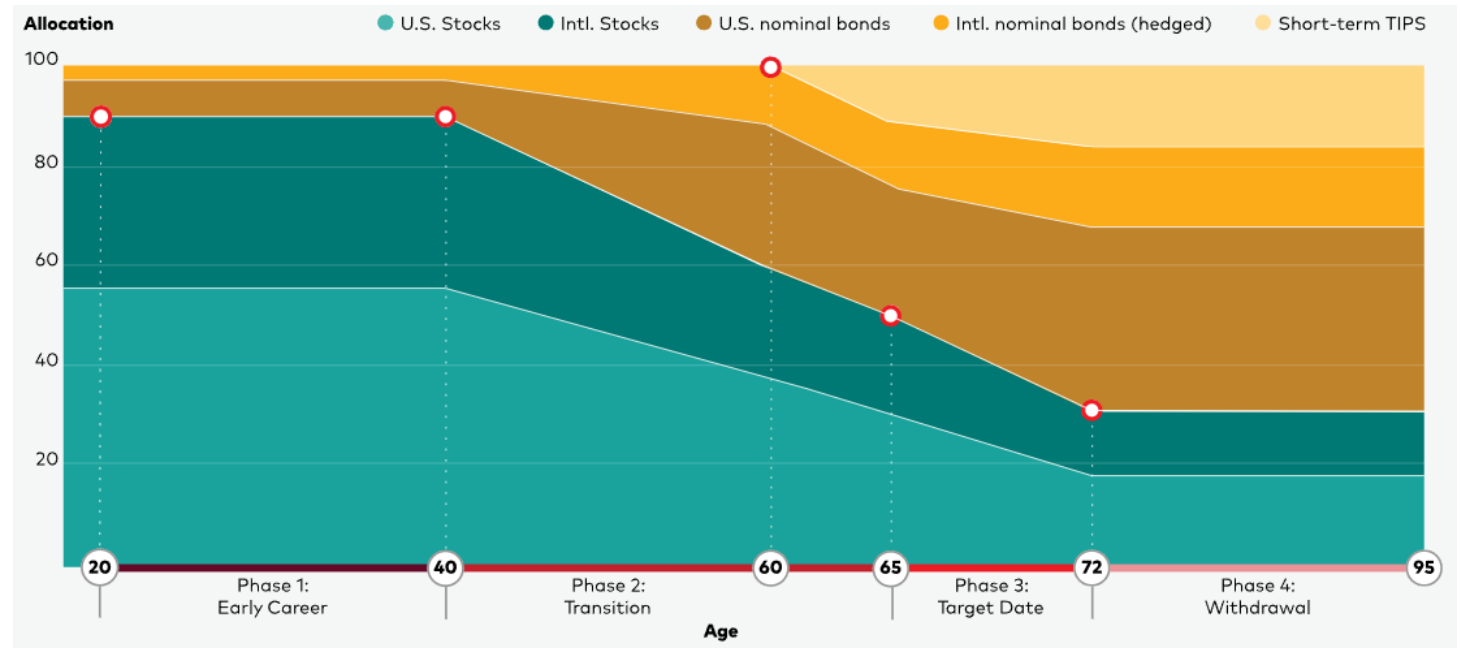
25% Each US LCB, US SCV, Int'l SCB, Int'l LCV

- + Massively diversified
- + > 2× S&P 500 over lifetime
- + 3.9% Safe Withdrawal Rate
- Doesn't track the market
- High volatility throughout
- Worst drawdowns are most likely in retirement
- Legacy >> Spending



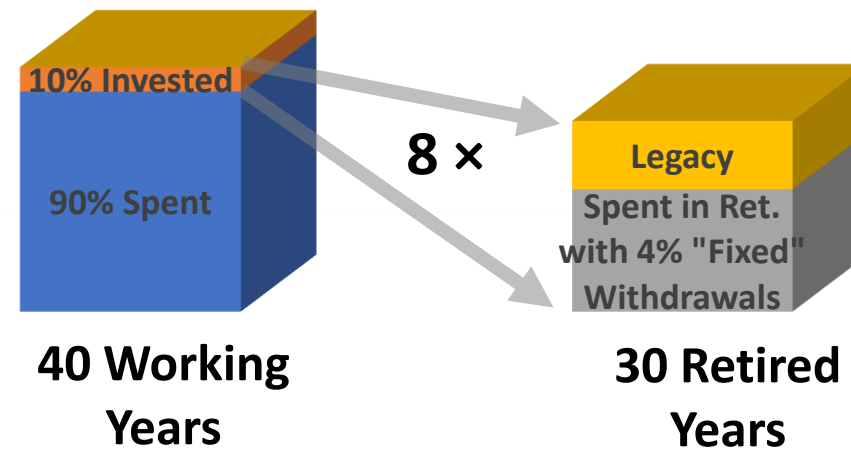
# Vanguard Target Retirement Funds

- Target Retirement 2015 (VTXVX)
- Target Retirement 2020 (VTWNVX)
- Target Retirement 2025 (VTTVX)
- Target Retirement 2030 (VTHRFX)
- Target Retirement 2035 (VTTHFX)
- Target Retirement 2040 (VFORFX)
- Target Retirement 2045 (VTIVFX)
- Target Retirement 2050 (VFIFFX)
- Target Retirement 2055 (VFFVFX)
- Target Retirement 2060 (VTTSFX)
- Target Retirement 2065 (VLXVFX)

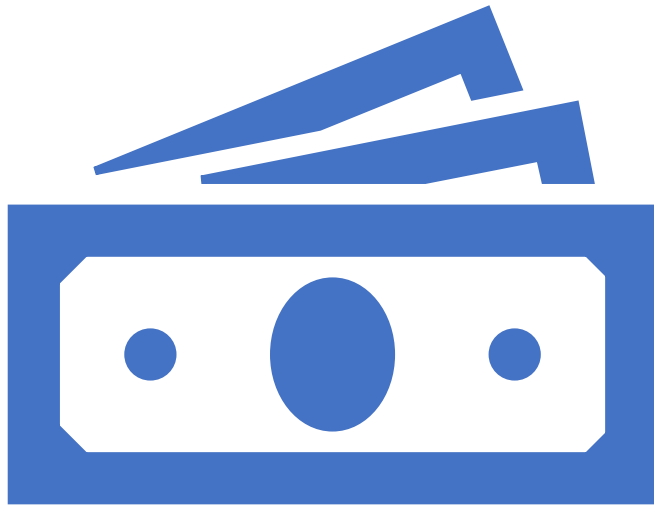


# Vanguard-Like Target-Date Fund (Real)

- + Automatic for life!
- + Volatility declines w/ age
- + 3.7% safe withdrawal rate
- + Spend > legacy
- Lower total return



<b>Real CAGR</b> Low, Median, High: 4.3%, <b>5.2%</b> , 5.6%
<b>Worst Accumulation Drawdown:</b> <b>42%</b> (48% w/o contributions)
<b>Worst Drawdown at Age-65:</b> <b>27%</b>
<b>30-Year Safe Withdrawal Rate in Retirement:</b> <b>3.7%</b>



# Would an 8× *real* multiple be bad?

---

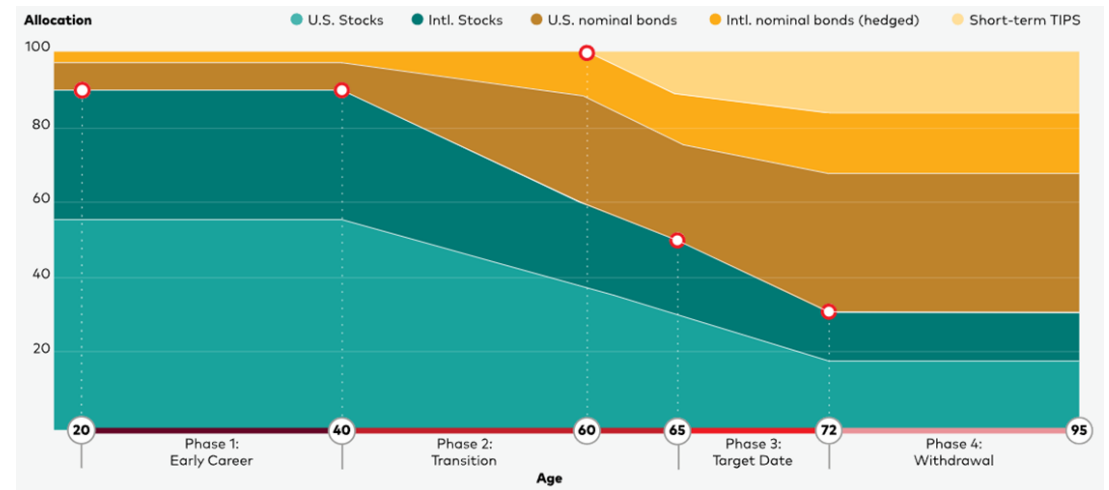
- Assume \$100k/yr income
- Spend \$90k/yr while working
- *Real* 4% withdrawals = ~\$67k/yr
- If +10% employer match = ~\$73k/yr
- That's >80% of pre-retirement spend rate
- Social security likely adds more
- And, there was > \$1M legacy at end



# How diversified is a target-date fund?

- ✓ Stocks – Market Risk
- ✓ Bonds – Term & Credit Risk
- ✓ Worldwide -- Geography

- ☐ Small?
- ☐ Value?
- ☐ Profitability?
- ☐ Investment?



# Easy 2 Funds for Life Strategy

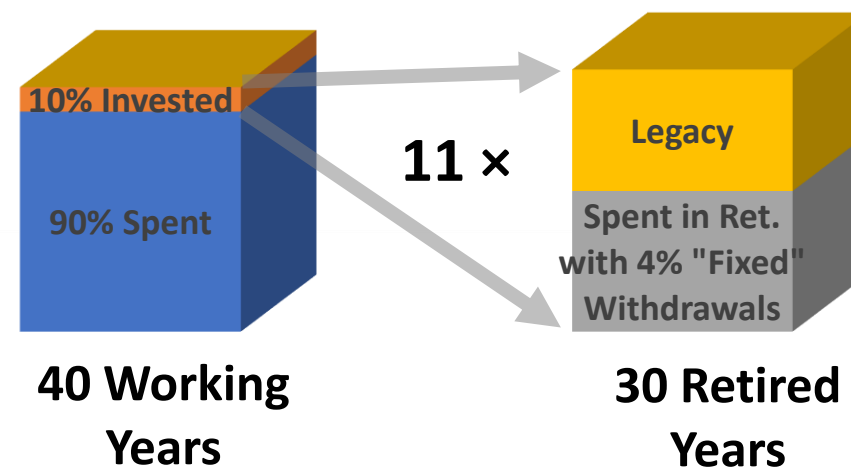
---

- Put 90% of retirement savings in target-date fund
- Put 10% into US small-cap value fund
- No rebalancing
- Take 4% “fixed” annual retirement withdrawals from the fund that’s bigger than its target allocation to “nudge” rebalance over time.



# Easy 90/10 2 Funds for Life (*Real*)

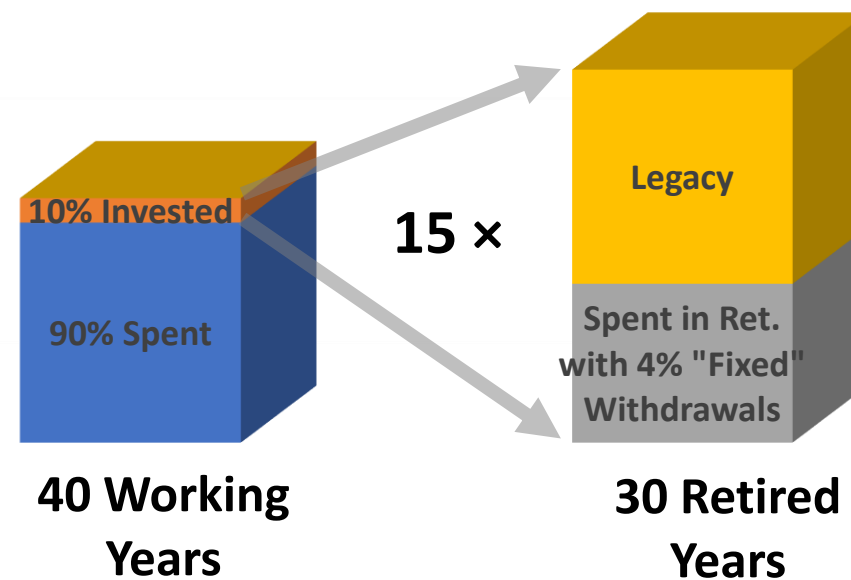
- + More 1.3× TDF over lifetime
- + Volatility declines w/age
- + >4% safe withdrawal rate
- More volatile than TDF alone
- Doesn't track the market



<b>Real CAGR</b> Low, Median, High: 4.7%, <b>5.8%</b> , 6.2%
<b>Worst Accumulation Drawdown:</b> <b>44%</b> (49% w/o contributions)
<b>Worst Drawdown at Age-65:</b> <b>35%</b>
<b>30-Year Safe Withdrawal Rate in Retirement:</b> <b>4.1%</b>

# Easy 80/20 2 Funds for Life (*Real*)

- + Almost 2× TDF over lifetime
- + Almost the 18× of the S&P 500
- + >4.5% safe withdrawal rate
- Higher volatility later
- Doesn't track the market



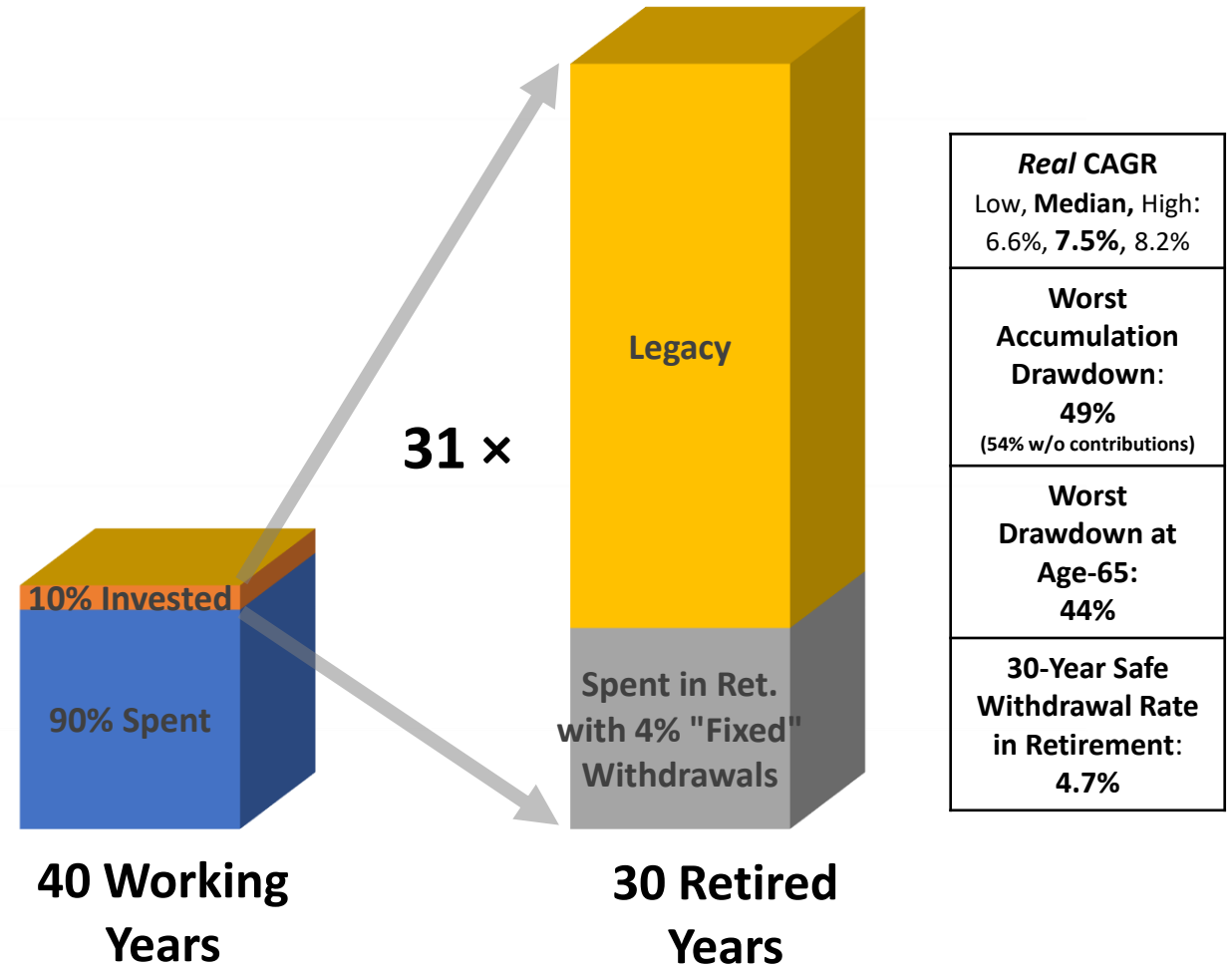
<b>Real CAGR</b> Low, <b>Median</b> , High: 5.3%, <b>6.3%</b> , 6.9%
<b>Worst Accumulation Drawdown:</b> <b>47%</b> (50% w/o contributions)
<b>Worst Drawdown at Age-65:</b> <b>42%</b>
<b>30-Year Safe Withdrawal Rate in Retirement:</b> <b>4.6%</b>



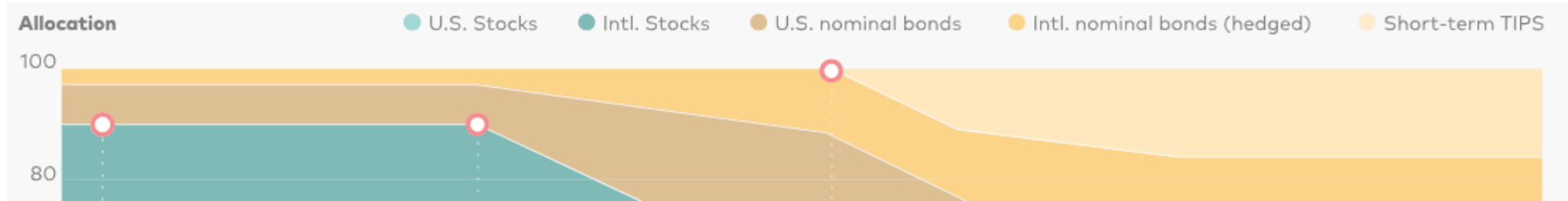
# 50/50 2 Funds for Life (*Real*)

## Rebalanced Annually

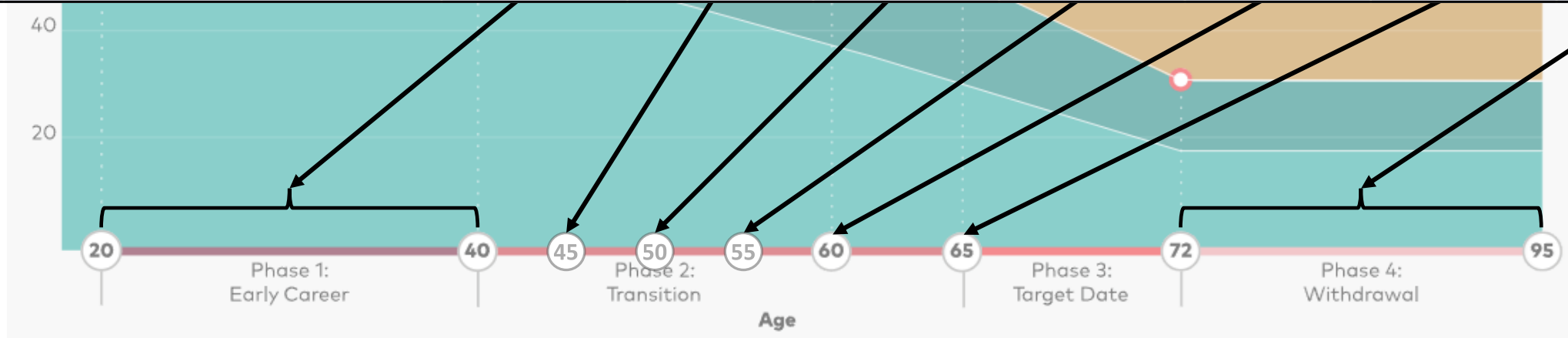
- + Almost 4× TDF over lifetime
- + Massively diversified
- + >4.5% safe withdrawal rate
- Higher volatility later
- Doesn't track the market



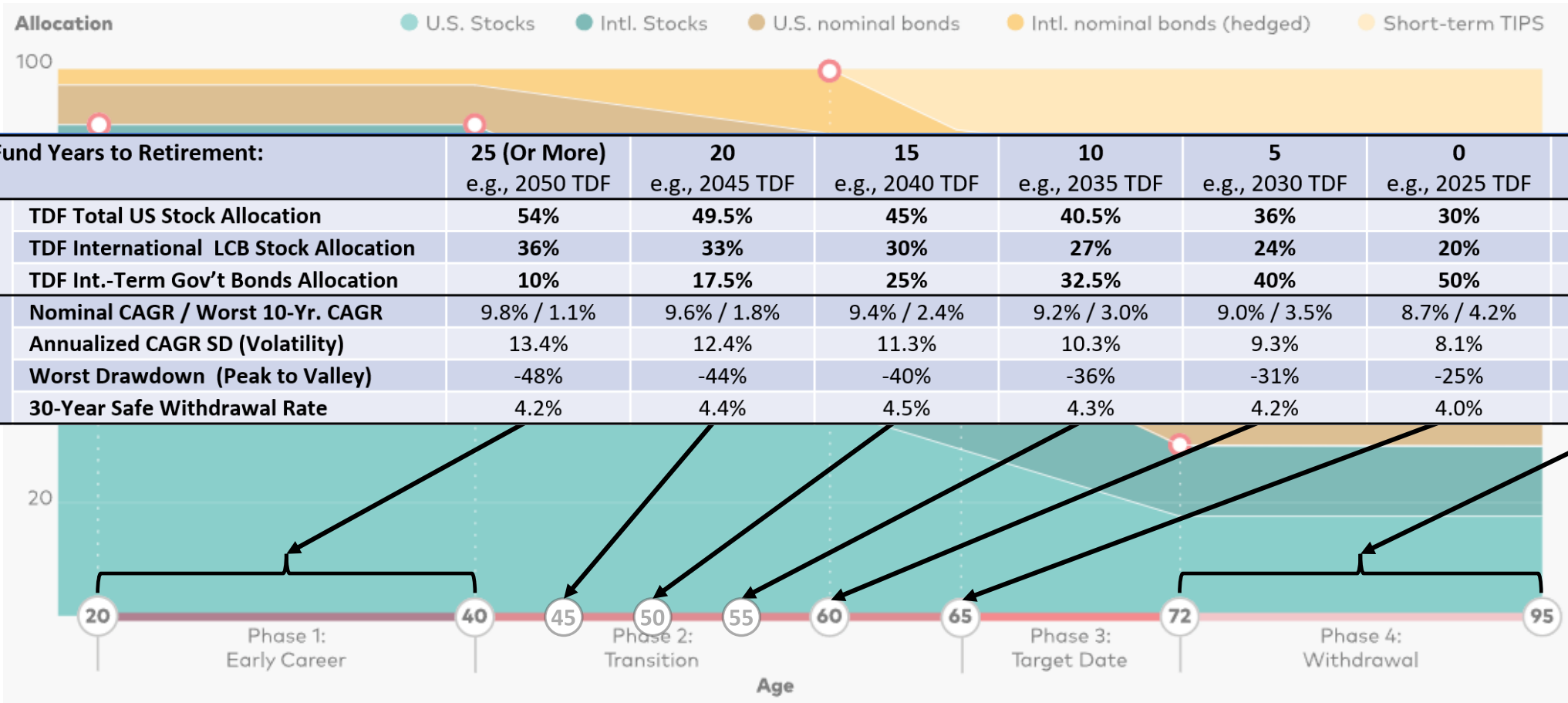
# Target-Date Funds – Approximate Allocations



Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%



# Historical TDF Lump Sum *Nominal* Results

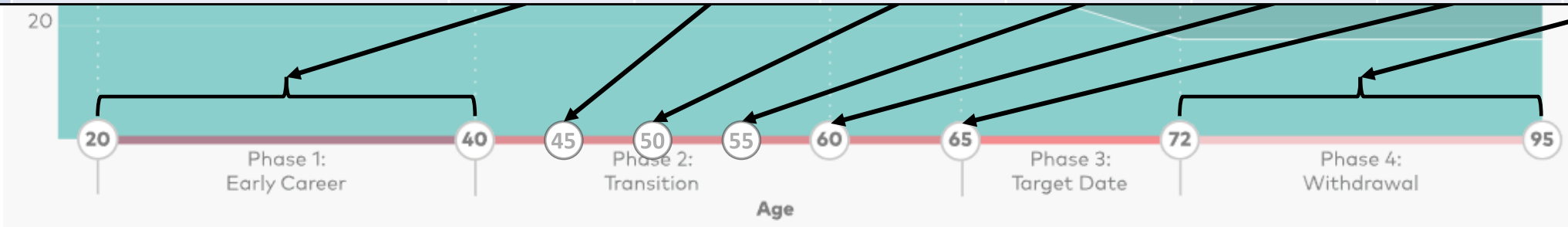


Backtested with lump sum investment, annual rebalancing, and monthly start dates from Jan. 1970 through Dec. 2022 for CAGRs, SD & drawdowns. Safe-withdrawal rates tested back to Jan. 1928.

# 90|10 2 Fund for Life Lump Sum *Nominal*

Allocation      U.S. Stocks      Intl. Stocks      U.S. nominal bonds      Intl. nominal bonds (hedged)      Short-term TIPS

Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.8% / 1.1%	9.6% / 1.8%	9.4% / 2.4%	9.2% / 3.0%	9.0% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.3%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-49%	-45%	-42%	-38%	-34%	-29%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%





# 80|20 2 Funds for Life Lump Sum *Nominal*

Allocation		U.S. Stocks	Intl. Stocks	U.S. nominal bonds	Intl. nominal bonds (hedged)	Short-term TIPS		
Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.8% / 1.1%	9.6% / 1.8%	9.4% / 2.4%	9.2% / 3.0%	9.0% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.3%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-49%	-45%	-42%	-38%	-34%	-29%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%
20% US SCV, 80% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.8% / 2.6%	10.7% / 3.1%	10.5% / 3.6%	10.4% / 4.1%	10.2% / 4.5%	10.0% / 5.1%	9.4% / 4.9%
	Annualized CAGR SD (Volatility)	14.3%	13.4%	12.6%	11.8%	10.9%	9.9%	7.9%
	Worst Drawdown (Peak to Valley)	-50%	-47%	-44%	-41%	-37%	-32%	-22%
	30-Year Safe Withdrawal Rate	4.1%	4.3%	4.5%	4.7%	4.7%	4.8%	4.6%

20

40

60

65

72

95

Phase 1:  
Early Career

Phase 2:  
Transition

Phase 3:  
Target Date

Phase 4:  
Withdrawal

Age

Backtested with lump sum investment, annual rebalancing, and monthly start dates from Jan. 1970 through Dec. 2022 for CAGRs, SD & drawdowns. Safe-withdrawal rates tested back to Jan. 1928.



## 2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table

Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.9% / 1.1%	9.6% / 1.3%	9.1% / 1.4%	9.1% / 3.0%	9.1% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.3%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.1%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	13.1%	11.8%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-49%	-45%	-42%	-38%	-34%	-29%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%
20% US SCV, 80% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.8% / 2.6%	10.7% / 3.1%	10.1% / 3.6%	10.1% / 4.1%	10.2% / 4.5%	10.0% / 5.1%	9.4% / 4.9%
	Annualized CAGR SD (Volatility)	14.3%	13.4%	12.2%	11.3%	10.1%	9.9%	7.9%
	Worst Drawdown (Peak to Valley)	-50%	-47%	-44%	-41%	-37%	-32%	-22%
	30-Year Safe Withdrawal Rate	4.1%	4.3%	4.5%	4.7%	4.7%	4.8%	4.6%
30% US SCV, 70% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.2% / 3.2%	11.1% / 3.7%	11.0% / 4.2%	10.9% / 4.6%	10.8% / 5.0%	10.6% / 5.5%	10.1% / 5.6%
	Annualized CAGR SD (Volatility)	14.3%	13.7%	12.4%	11.6%	11.9%	11.0%	9.3%
	Worst Drawdown (Peak to Valley)	-51%	-48%	-45%	-42%	-40%	-36%	-27%
	30-Year Safe Withdrawal Rate	4.0%	4.2%	4.3%	4.5%	4.7%	4.8%	4.8%
40% US SCV, 60% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.7% / 3.9%	11.6% / 4.3%	11.5% / 4.7%	11.4% / 5.1%	11.3% / 5.4%	11.1% / 5.8%	10.8% / 6.2%
	Annualized CAGR SD (Volatility)	15.1%	14.9%	14.2%	13.6%	13.0%	12.2%	10.7%
	Worst Drawdown (Peak to Valley)	-52%	-50%	-48%	-46%	-44%	-40%	-33%
	30-Year Safe Withdrawal Rate	3.8%	4.0%	4.1%	4.3%	4.4%	4.6%	4.9%
50% US SCV, 50% TDF	Nominal CAGR / Worst 10-Yr. CAGR	12.1% / 4.5%	12.0% / 4.9%	12.0% / 5.2%	11.9% / 5.5%	11.8% / 5.8%	11.7% / 6.2%	11.4% / 6.4%
	Annualized CAGR SD (Volatility)	16.2%	15.7%	15.2%	14.7%	14.2%	13.5%	12.3%
	Worst Drawdown (Peak to Valley)	-54%	-52%	-51%	-49%	-47%	-44%	-39%
	30-Year Safe Withdrawal Rate	3.6%	3.8%	3.9%	4.0%	4.1%	4.3%	4.7%
100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)                          Annualized CAGR SD: 20.6%                          Worst Drawdown: -61%                          30-Year SWR: 2.5%							

Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns.

US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds.

- Young investors who contribute regularly will likely see lower drawdowns while contributions are large relative to account balance.
  - Investors who rebalance less frequently will likely see higher returns and higher drawdowns.
  - Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.
- Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.

## 2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table

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	Annualized CAGR SD (Volatility)	12.4%	12.4%	11.3%	10.3%	9.0%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-42%	-41%	-40%	-37%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.5%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-32%	-29%	-26%	-23%	-19%	-16%	-12%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%
20% US SCV, 80% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.5% / 2.6%	10.7% / 3.1%	10.5% / 3.6%	10.4% / 4.1%	10.2% / 4.5%	10.0% / 5.1%	9.4% / 4.9%
	Annualized CAGR SD (Volatility)	14.3%	13.4%	12.6%	11.8%	10.9%	9.9%	7.9%
	Worst Drawdown (Peak to Valley)	-50%	-47%	-44%	-41%	-37%	-32%	-22%
	30-Year Safe Withdrawal Rate	4.0%	4.1%	4.1%	4.7%	4.7%	4.8%	4.6%
30% US SCV, 70% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.2% / 3.2%	11.2% / 3.7%	11.0% / 4.2%	10.9% / 4.5%	10.8% / 4.8%	10.6% / 5.5%	10.1% / 5.6%
	Annualized CAGR SD (Volatility)	14.8%	14.1%	13.4%	12.6%	11.9%	11.0%	9.3%
	Worst Drawdown (Peak to Valley)	-51%	-48%	-46%	-43%	-40%	-36%	-27%
	30-Year Safe Withdrawal Rate	4.0%	4.2%	4.3%	4.5%	4.7%	4.8%	4.8%
40% US SCV, 60% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.9% / 3.9%	11.6% / 4.1%	11.1% / 4.4%	10.9% / 5.1%	10.9% / 5.1%	11.1% / 5.8%	10.8% / 6.2%
	Annualized CAGR SD (Volatility)	15.5%	14.9%	14.2%	13.6%	13.0%	12.2%	10.7%
	Worst Drawdown (Peak to Valley)	-52%	-50%	-48%	-46%	-44%	-40%	-33%
	30-Year Safe Withdrawal Rate	3.9%	4.0%	4.1%	4.3%	4.4%	4.6%	4.9%
50% US SCV, 50% TDF	Nominal CAGR / Worst 10-Yr. CAGR	12.1% / 4.5%	12.1% / 4.4%	11.0% / 4.7%	10.9% / 5.1%	10.9% / 5.8%	11.7% / 6.2%	11.4% / 6.4%
	Annualized CAGR SD (Volatility)	16.2%	15.1%	14.2%	13.7%	13.2%	13.5%	12.3%
	Worst Drawdown (Peak to Valley)	-54%	-52%	-51%	-49%	-47%	-44%	-39%
	30-Year Safe Withdrawal Rate	3.6%	3.7%	3.9%	4.0%	4.1%	4.3%	4.7%
100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)                          Annualized CAGR SD: 20.6%                          Worst Drawdown: -61%                          30-Year SWR: 2.5%							

Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns.

US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds.

- Young investors who contribute regularly will likely see lower drawdowns while contributions are large relative to account balance.
  - Investors who rebalance less frequently will likely see higher returns and higher drawdowns.
  - Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.
- Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.



## 2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table – **ASSET ALLOCATIONS**

Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
	US Small-Cap Value	--	--	--	--	--	--	--
10% US SCV, 90% TDF	Total US Stock Allocation	48.6%	44.6%	50%	36.5%	40%	27%	16.2%
	International LCB Stock Allocation	32.4%	29.7%	27%	24.3%	21.6%	18%	10.8%
	Int.-Term Gov't Bonds Allocation	9%	15.8%	22.5%	29.3%	36%	45%	63%
	US Small-Cap Value	10%	10%	10%	10%	10%	10%	10%
20% US SCV, 80% TDF	Total US Stock Allocation	43.2%	39.6%	36%	32.4%	28.8%	24%	14.4%
	International LCB Stock Allocation	28.8%	26.4%	24%	21.6%	19.2%	16%	9.6%
	Int.-Term Gov't Bonds Allocation	8%	14%	20%	26%	32%	40%	56%
	US Small-Cap Value	20%	20%	20%	20%	20%	20%	20%
30% US SCV, 70% TDF	Total US Stock Allocation	37.8%	34.7%	31.5%	28.4%	25.2%	21%	12.6%
	International LCB Stock Allocation	25.2%	23.1%	21%	18.9%	16.8%	14%	8.4%
	Int.-Term Gov't Bonds Allocation	7%	12.3%	17.5%	22.8%	28%	35%	49%
	US Small-Cap Value	30%	30%	30%	30%	30%	30%	30%
40% US SCV, 60% TDF	Total US Stock Allocation	32.4%	29.7%	27%	24.3%	21.6%	18%	10.8%
	International LCB Stock Allocation	21.6%	19.8%	18%	16.2%	14.4%	12%	7.2%
	Int.-Term Gov't Bonds Allocation	6%	10.5%	15%	19.5%	24%	30%	42%
	US Small-Cap Value	40%	40%	40%	40%	40%	40%	40%
50% US SCV, 50% TDF	Total US Stock Allocation	27%	24.8%	22.5%	20.3%	18%	15%	9%
	International LCB Stock Allocation	18%	16.5%	15%	13.5%	12%	10%	6%
	Int.-Term Gov't Bonds Allocation	5%	8.8%	12.5%	16.3%	20%	25%	35%
	US Small-Cap Value	50%	50%	50%	50%	50%	50%	50%
100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)			Annualized CAGR SD: 20.6%	Worst Drawdown: -61%		30-Year SWR: 2.5%	

Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns.

US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds.

- Young investors who contribute regularly will likely see lower drawdowns while contributions are large relative to account balance.
  - Investors who rebalance less frequently will likely see higher returns and higher drawdowns.
  - Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.
- Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.



## 2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table

Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.8% / 1.1%	9.6% / 1.8%	9.4% / 2.4%	9.2% / 3.0%	9.0% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.3%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-49%	-45%	-42%	-38%	-34%	-29%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%
20% US SCV, 80% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.8% / 2.6%	10.7% / 3.1%	10.5% / 3.6%	10.4% / 4.1%	10.2% / 4.5%	10.0% / 5.1%	9.4% / 4.9%
	Annualized CAGR SD (Volatility)	14.3%	13.4%	12.6%	11.8%	10.9%	9.9%	7.9%
	Worst Drawdown (Peak to Valley)	-50%	-47%	-44%	-41%	-37%	-32%	-22%
	30-Year Safe Withdrawal Rate	4.1%	4.3%	4.5%	4.7%	4.7%	4.8%	4.6%
30% US SCV, 70% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.2% / 3.2%	11.1% / 3.7%	11.0% / 4.2%	10.9% / 4.6%	10.8% / 5.0%	10.6% / 5.5%	10.1% / 5.6%
	Annualized CAGR SD (Volatility)	14.8%	14.1%	13.4%	12.6%	11.9%	11.0%	9.3%
	Worst Drawdown (Peak to Valley)	-51%	-48%	-46%	-43%	-40%	-36%	-27%
	30-Year Safe Withdrawal Rate	4.0%	4.2%	4.3%	4.5%	4.7%	4.8%	4.8%
40% US SCV, 60% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.7% / 3.9%	11.6% / 4.3%	11.5% / 4.7%	11.4% / 5.1%	11.3% / 5.4%	11.1% / 5.8%	10.8% / 6.2%
	Annualized CAGR SD (Volatility)	15.5%	14.9%	14.2%	13.6%	13.0%	12.2%	10.7%
	Worst Drawdown (Peak to Valley)	-52%	-50%	-48%	-46%	-44%	-40%	-33%
	30-Year Safe Withdrawal Rate	3.8%	4.0%	4.1%	4.3%	4.4%	4.6%	4.9%
50% US SCV, 50% TDF	Nominal CAGR / Worst 10-Yr. CAGR	12.1% / 4.5%	12.0% / 4.9%	12.0% / 5.2%	11.9% / 5.5%	11.8% / 5.8%	11.7% / 6.2%	11.4% / 6.4%
	Annualized CAGR SD (Volatility)	16.2%	15.7%	15.2%	14.7%	14.2%	13.5%	12.3%
	Worst Drawdown (Peak to Valley)	-54%	-52%	-51%	-49%	-47%	-44%	-39%
	30-Year Safe Withdrawal Rate	3.6%	3.7%	3.9%	4.0%	4.1%	4.3%	4.7%
100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)                          Annualized CAGR SD: 20.6%                          Worst Drawdown: -61%                          30-Year SWR: 2.5%							

Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns.

US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds.

- Young investors who contribute regularly will likely see lower drawdowns while contributions are large relative to account balance.
  - Investors who rebalance less frequently will likely see higher returns and higher drawdowns.
  - Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.
- Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.

≥ 11%  
CAGR

2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table								
Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.8% / 1.1%	9.6% / 1.8%	9.4% / 2.4%	9.2% / 3.0%	9.0% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.3%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-49%	-45%	-42%	-38%	-34%	-29%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%
20% US SCV, 80% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.8% / 2.6%	10.7% / 3.1%	10.5% / 3.6%	10.4% / 4.1%	10.2% / 4.5%	10.0% / 5.1%	9.4% / 4.9%
	Annualized CAGR SD (Volatility)	14.3%	13.4%	12.6%	11.8%	10.9%	9.9%	7.9%
	Worst Drawdown (Peak to Valley)	-50%	-47%	-44%	-41%	-37%	-32%	-22%
	30-Year Safe Withdrawal Rate	4.1%	4.3%	4.5%	4.7%	4.7%	4.8%	4.6%
30% US SCV, 70% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.2% / 3.2%	11.1% / 3.7%	11.0% / 4.2%	10.9% / 4.6%	10.8% / 5.0%	10.6% / 5.5%	10.1% / 5.6%
	Annualized CAGR SD (Volatility)	14.8%	14.1%	13.4%	12.6%	11.9%	11.0%	9.3%
	Worst Drawdown (Peak to Valley)	-51%	-48%	-46%	-43%	-40%	-36%	-27%
	30-Year Safe Withdrawal Rate	4.0%	4.2%	4.3%	4.5%	4.7%	4.8%	4.8%
40% US SCV, 60% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.7% / 3.9%	11.6% / 4.3%	11.5% / 4.7%	11.4% / 5.1%	11.3% / 5.4%	11.1% / 5.8%	10.8% / 6.2%
	Annualized CAGR SD (Volatility)	15.5%	14.9%	14.2%	13.6%	13.0%	12.2%	10.7%
	Worst Drawdown (Peak to Valley)	-52%	-50%	-48%	-46%	-44%	-40%	-33%
	30-Year Safe Withdrawal Rate	3.8%	4.0%	4.1%	4.3%	4.4%	4.6%	4.9%
50% US SCV, 50% TDF	Nominal CAGR / Worst 10-Yr. CAGR	12.1% / 4.5%	12.0% / 4.9%	12.0% / 5.2%	11.9% / 5.5%	11.8% / 5.8%	11.7% / 6.2%	11.4% / 6.4%
	Annualized CAGR SD (Volatility)	16.2%	15.7%	15.2%	14.7%	14.2%	13.5%	12.3%
	Worst Drawdown (Peak to Valley)	-54%	-52%	-51%	-49%	-47%	-44%	-39%
	30-Year Safe Withdrawal Rate	3.6%	3.7%	3.9%	4.0%	4.1%	4.3%	4.7%
100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)      Annualized CAGR SD: 20.6%      Worst Drawdown: -61%      30-Year SWR: 2.5%							
Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns. US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds. <ul style="list-style-type: none"><li>• Young investors who contribute regularly will likely see lower drawdowns while contributions are large relative to account balance.<ul style="list-style-type: none"><li>• Investors who rebalance less frequently will likely see higher returns and higher drawdowns.</li><li>• Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.</li></ul></li><li>• Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.</li></ul>								

Less  
Than  
40%  
Peak  
To  
Trough  
Loss



## 2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table

Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.8% / 1.1%	9.6% / 1.8%	9.4% / 2.4%	9.2% / 3.0%	9.0% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.3%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-49%	-45%	-42%	-38%	-34%	-29%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%
20% US SCV, 80% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.8% / 2.6%	10.7% / 3.1%	10.5% / 3.6%	10.4% / 4.1%	10.2% / 4.5%	10.0% / 5.1%	9.4% / 4.9%
	Annualized CAGR SD (Volatility)	14.3%	13.4%	12.6%	11.8%	10.9%	9.9%	7.9%
	Worst Drawdown (Peak to Valley)	-50%	-47%	-44%	-41%	-37%	-32%	-22%
	30-Year Safe Withdrawal Rate	4.1%	4.3%	4.5%	4.7%	4.7%	4.8%	4.6%
30% US SCV, 70% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.2% / 3.2%	11.1% / 3.7%	11.0% / 4.2%	10.9% / 4.6%	10.8% / 5.0%	10.6% / 5.5%	10.1% / 5.6%
	Annualized CAGR SD (Volatility)	14.8%	14.1%	13.4%	12.6%	11.9%	11.0%	9.3%
	Worst Drawdown (Peak to Valley)	-51%	-48%	-46%	-43%	-40%	-36%	-27%
	30-Year Safe Withdrawal Rate	4.0%	4.2%	4.3%	4.5%	4.7%	4.8%	4.8%
40% US SCV, 60% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.7% / 3.9%	11.6% / 4.3%	11.5% / 4.7%	11.4% / 5.1%	11.3% / 5.4%	11.1% / 5.8%	10.8% / 6.2%
	Annualized CAGR SD (Volatility)	15.5%	14.9%	14.2%	13.6%	13.0%	12.2%	10.7%
	Worst Drawdown (Peak to Valley)	-52%	-50%	-48%	-46%	-44%	-40%	-33%
	30-Year Safe Withdrawal Rate	3.8%	4.0%	4.1%	4.3%	4.4%	4.6%	4.9%
50% US SCV, 50% TDF	Nominal CAGR / Worst 10-Yr. CAGR	12.1% / 4.5%	12.0% / 4.9%	12.0% / 5.2%	11.9% / 5.5%	11.8% / 5.8%	11.7% / 6.2%	11.4% / 6.4%
	Annualized CAGR SD (Volatility)	16.2%	15.7%	15.2%	14.7%	14.2%	13.5%	12.3%
	Worst Drawdown (Peak to Valley)	-54%	-52%	-51%	-49%	-47%	-44%	-39%
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100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)                          Annualized CAGR SD: 20.6%                          Worst Drawdown: -61%                          30-Year SWR: 2.5%							

Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns. US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds.

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  - Investors who rebalance less frequently will likely see higher returns and higher drawdowns.
  - Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.
- Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.

≥ 4.4%  
SWR

2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table								
Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.8% / 1.1%	9.6% / 1.8%	9.4% / 2.4%	9.2% / 3.0%	9.0% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.5%	4.3%	4.2%	4.0%	3.5%
10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
	Worst Drawdown (Peak to Valley)	-49%	-45%	-42%	-38%	-34%	-29%	-17%
	30-Year Safe Withdrawal Rate	4.2%	4.4%	4.6%	4.6%	4.6%	4.5%	4.1%
20% US SCV, 80% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.8% / 2.6%	10.7% / 3.1%	10.5% / 3.6%	10.4% / 4.1%	10.2% / 4.5%	10.0% / 5.1%	9.4% / 4.9%
	Annualized CAGR SD (Volatility)	14.3%	13.4%	12.6%	11.8%	10.9%	9.9%	7.9%
	Worst Drawdown (Peak to Valley)	-50%	-47%	-44%	-41%	-37%	-32%	-22%
	30-Year Safe Withdrawal Rate	4.1%	4.3%	4.5%	4.7%	4.7%	4.8%	4.6%
30% US SCV, 70% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.2% / 3.2%	11.1% / 3.7%	11.0% / 4.2%	10.9% / 4.6%	10.8% / 5.0%	10.6% / 5.5%	10.1% / 5.6%
	Annualized CAGR SD (Volatility)	14.8%	14.1%	13.4%	12.6%	11.9%	11.0%	9.3%
	Worst Drawdown (Peak to Valley)	-51%	-48%	-46%	-43%	-40%	-36%	-27%
	30-Year Safe Withdrawal Rate	4.0%	4.2%	4.3%	4.5%	4.7%	4.8%	4.8%
40% US SCV, 60% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.7% / 3.9%	11.6% / 4.3%	11.5% / 4.7%	11.4% / 5.1%	11.3% / 5.4%	11.1% / 5.8%	10.8% / 6.2%
	Annualized CAGR SD (Volatility)	15.5%	14.9%	14.2%	13.6%	13.0%	12.2%	10.7%
	Worst Drawdown (Peak to Valley)	-52%	-50%	-48%	-46%	-44%	-40%	-33%
	30-Year Safe Withdrawal Rate	3.8%	4.0%	4.1%	4.3%	4.4%	4.6%	4.9%
50% US SCV, 50% TDF	Nominal CAGR / Worst 10-Yr. CAGR	12.1% / 4.5%	12.0% / 4.9%	12.0% / 5.2%	11.9% / 5.5%	11.8% / 5.8%	11.7% / 6.2%	11.4% / 6.4%
	Annualized CAGR SD (Volatility)	16.2%	15.7%	15.2%	14.7%	14.2%	13.5%	12.3%
	Worst Drawdown (Peak to Valley)	-54%	-52%	-51%	-49%	-47%	-44%	-39%
	30-Year Safe Withdrawal Rate	3.6%	3.7%	3.9%	4.0%	4.1%	4.3%	4.7%
100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)      Annualized CAGR SD: 20.6%      Worst Drawdown: -61%      30-Year SWR: 2.5%							
Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns. US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds. <ul style="list-style-type: none"><li>• Young investors who contribute regularly will likely see lower drawdowns while contributions are large relative to account balance.<ul style="list-style-type: none"><li>• Investors who rebalance less frequently will likely see higher returns and higher drawdowns.</li><li>• Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.</li></ul></li><li>• Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.</li></ul>								

≥ 11%  
CAGR

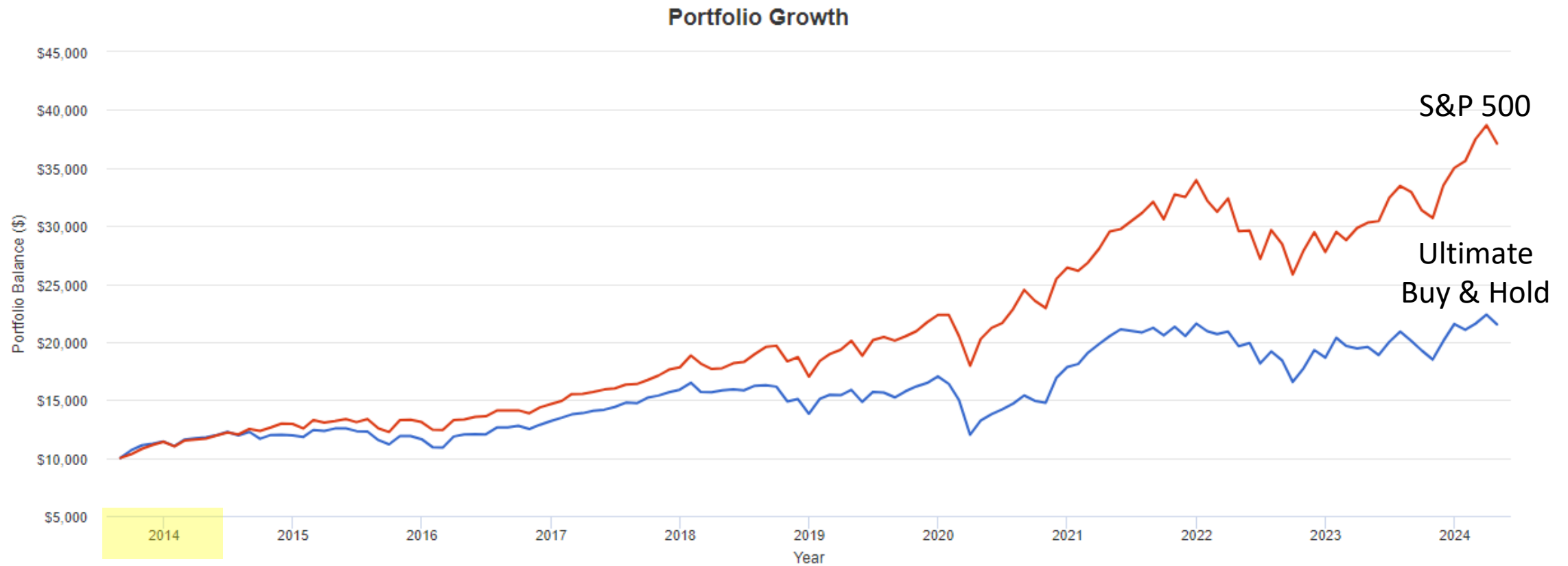
&

< 40%  
Worst  
DD

&

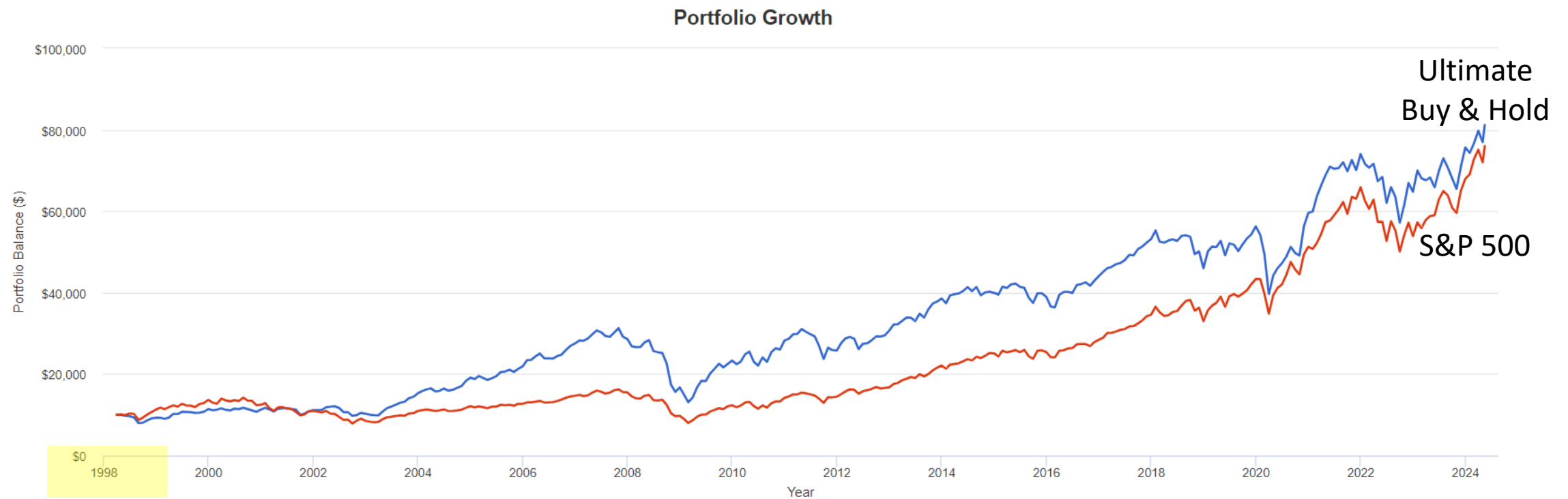
≥ 4.4%  
SWR

# Sounds easy – why doesn't everyone do it?



*Backtested with lump sum investment, annual rebalancing, and selection of Best-in-Class ETF recommendations that go back to 2013.*

# Sounds easy – why doesn't everyone do it?



*Backtested with lump sum investment, annual rebalancing, and selection of DFA and Vanguard funds that go back to April, 1998.*





What kind of investor are you?

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# Summary

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- Diversification can
  - Increase return-per-unit-of-risk
  - Minimize risk for needed returns
  - Increase safe withdrawal rates
  - Protect against geographic risks
  - Reduce uncertainty of results
- Impatience can undo it all
- Zoom out & keep learning!

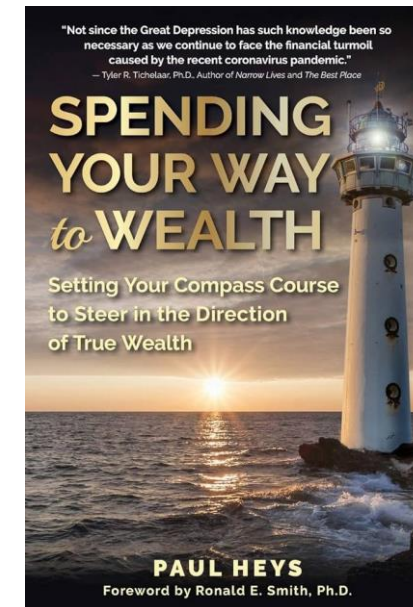
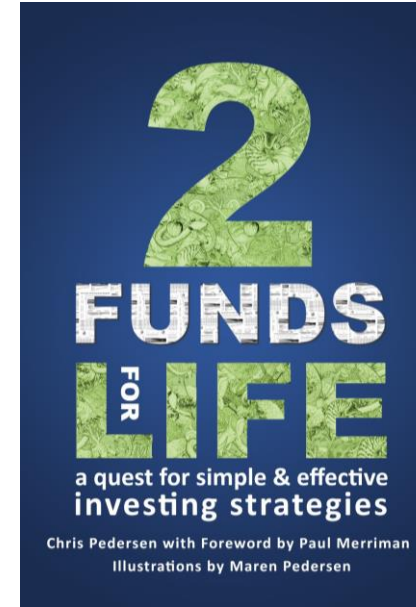




# To learn more

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- [www.paulmerriman.com](http://www.paulmerriman.com) for books, articles, fund recommendations, videos, podcasts and more.
- **Sign up** for the free newsletter to get a download link for *We're Talking Millions* and *2 Funds for Life*
- **Read *Spending Your Way to Wealth***



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# *Any Questions?*

(for more Iceland eye candy: [bit.ly/44xp0Uw](https://bit.ly/44xp0Uw))  
(for more Eclipse eye candy: [bit.ly/3QL2rqm](https://bit.ly/3QL2rqm))

Chris Pedersen

The Merriman Financial Education  
Foundation

May 18, 2024

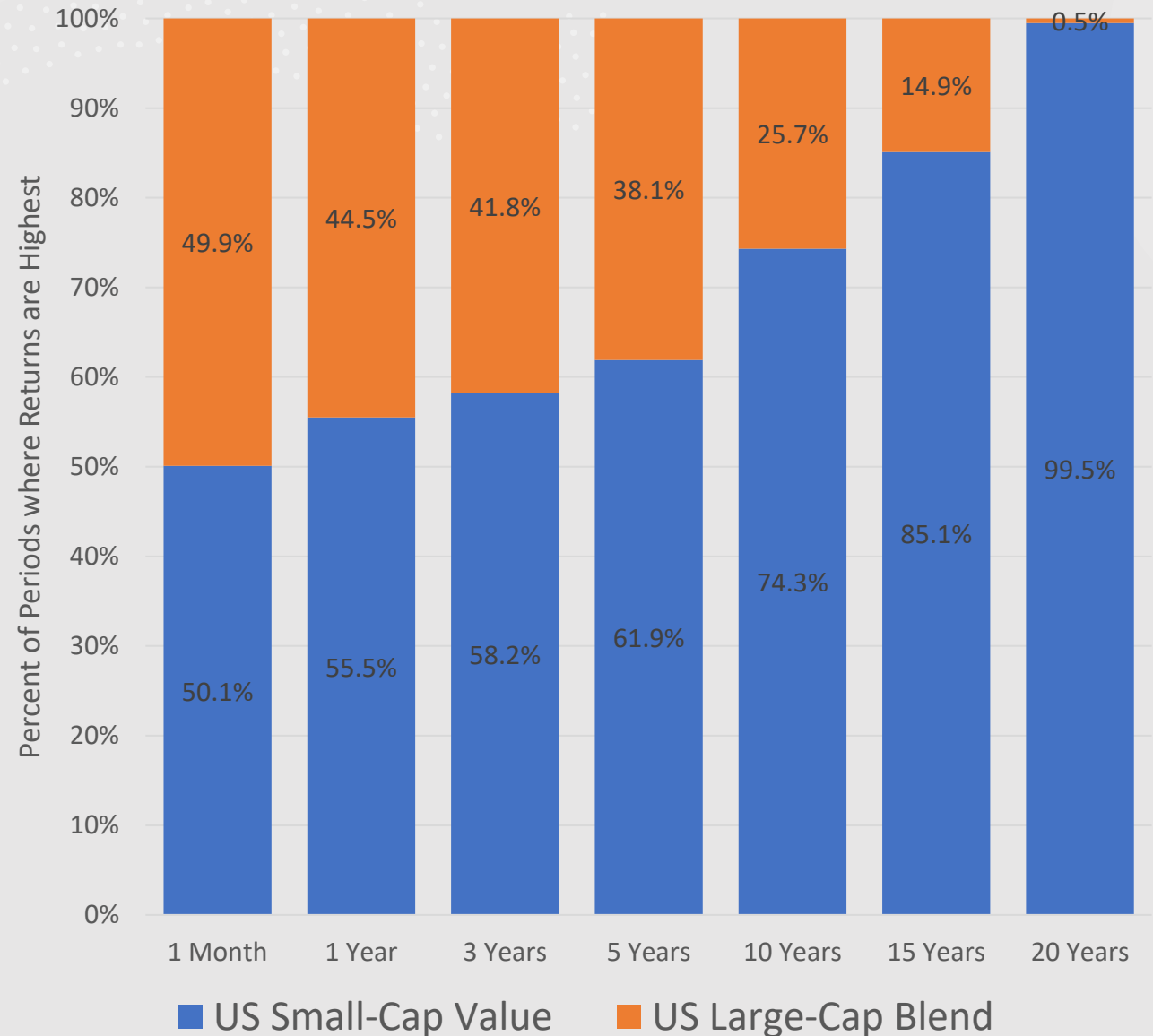




Backup

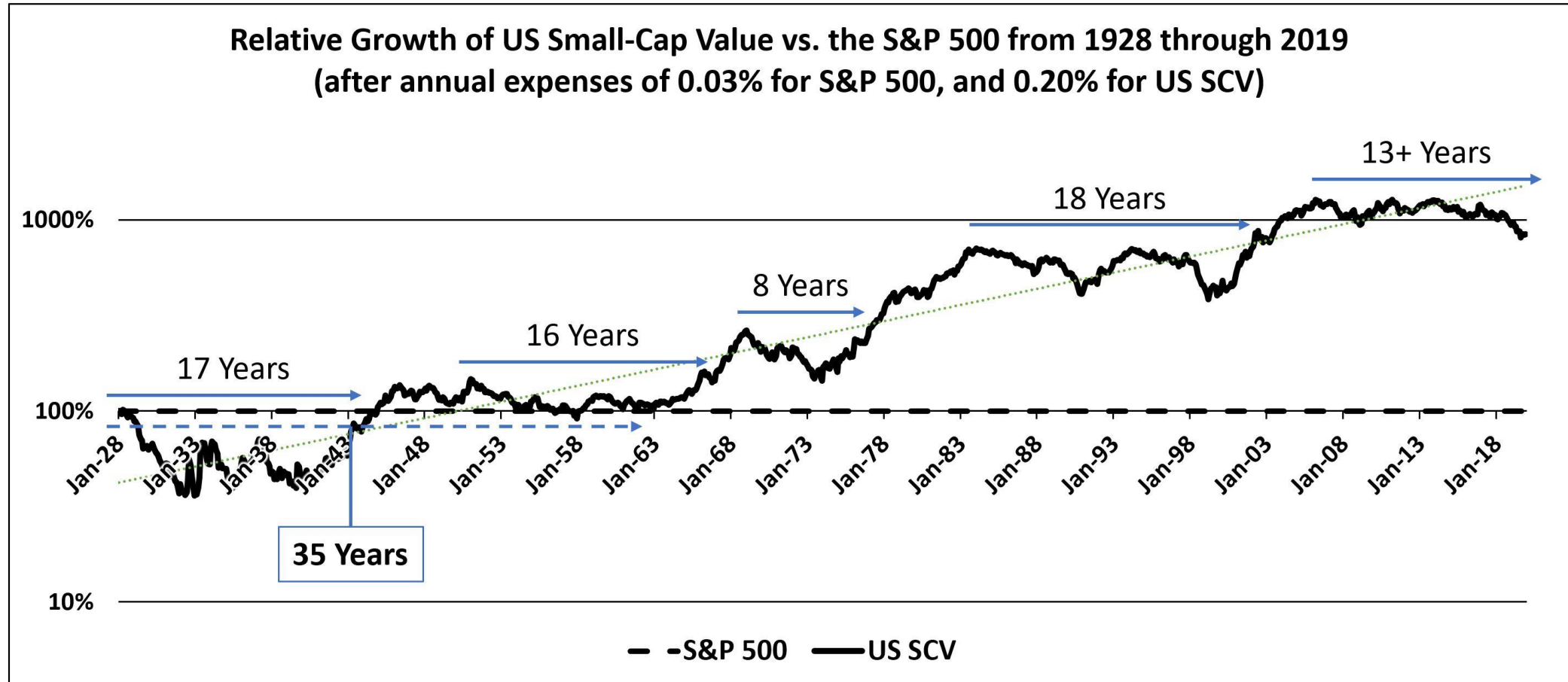
# Why not go all-in on Small-Cap Value?

Historical Probability of Outperformance versus Holding Periods

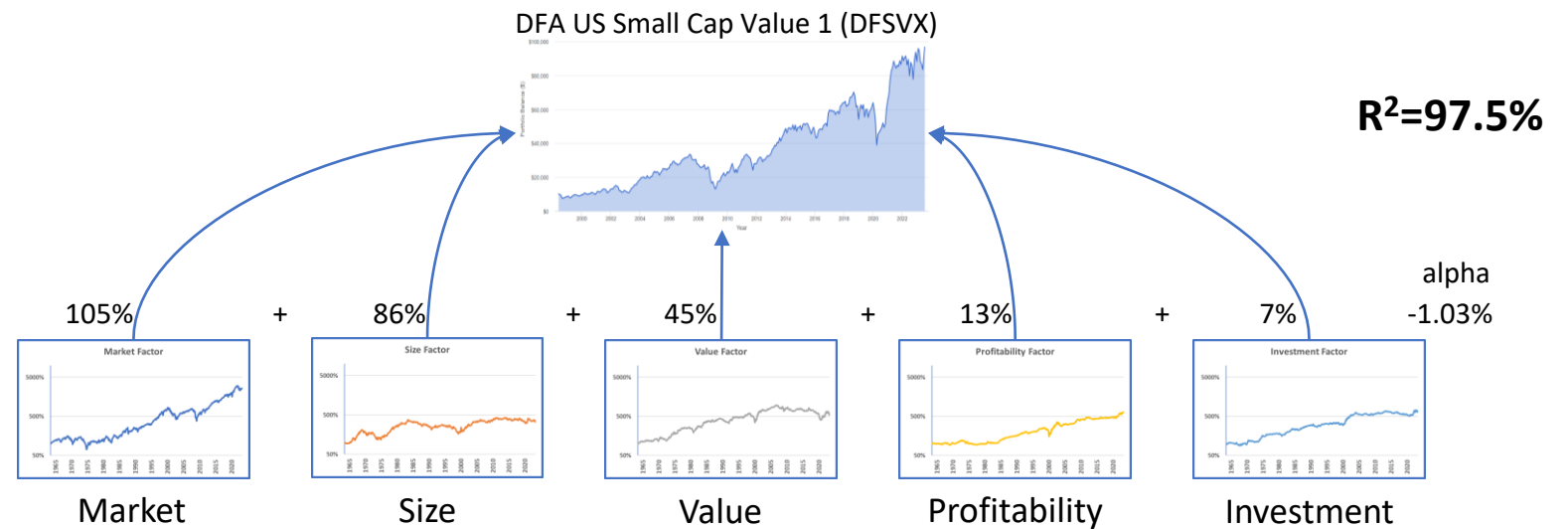


Source: IFA.com Index Comparison Chart (1/1/1928 – 6/30/2023), rounded to one decimal point

# Why not go all-in on Small-Cap Value?



Factor models  
can explain  
>95% of return  
variations

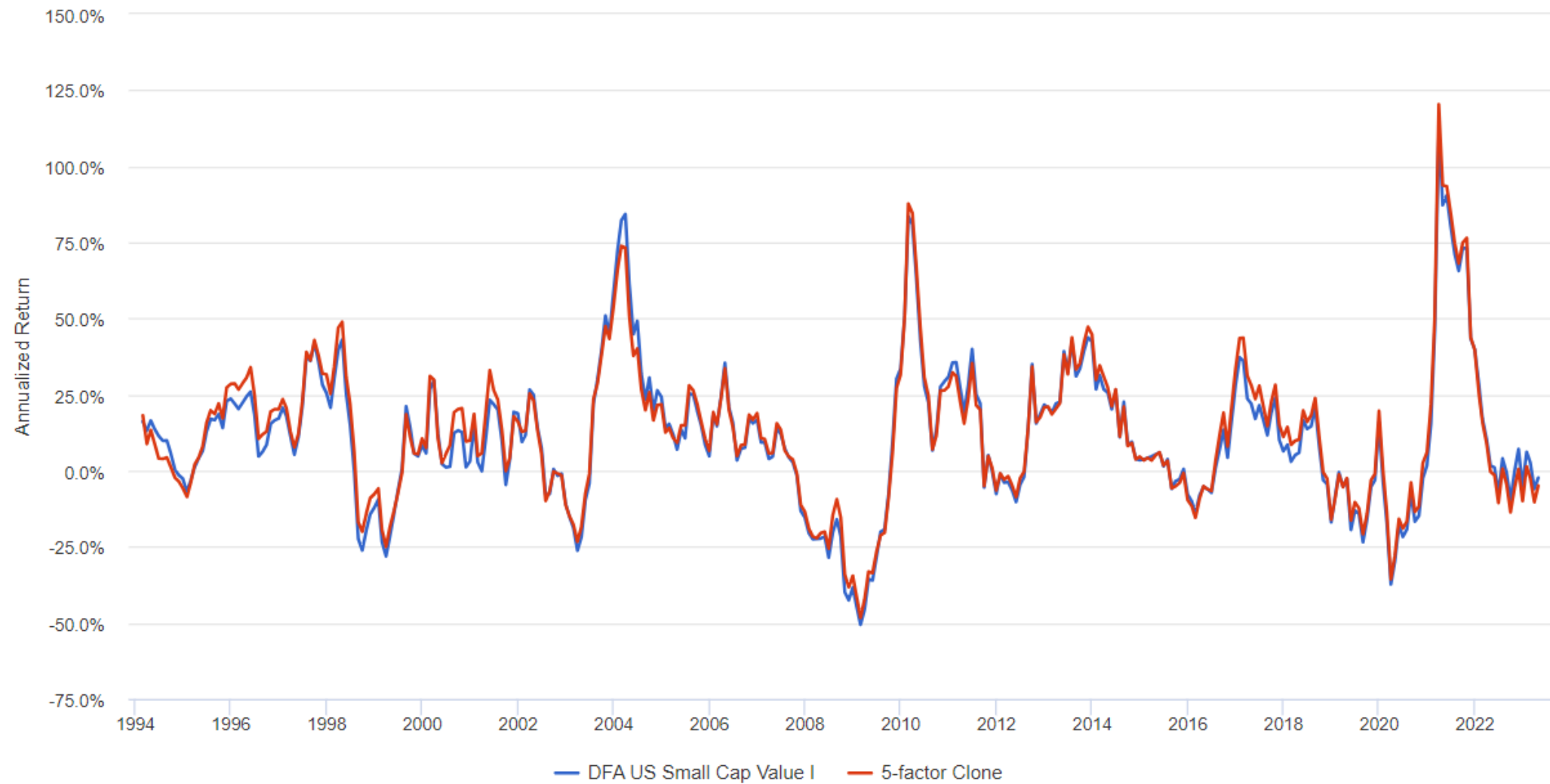


Source: [portfoliovisualizer.com](https://portfoliovisualizer.com)

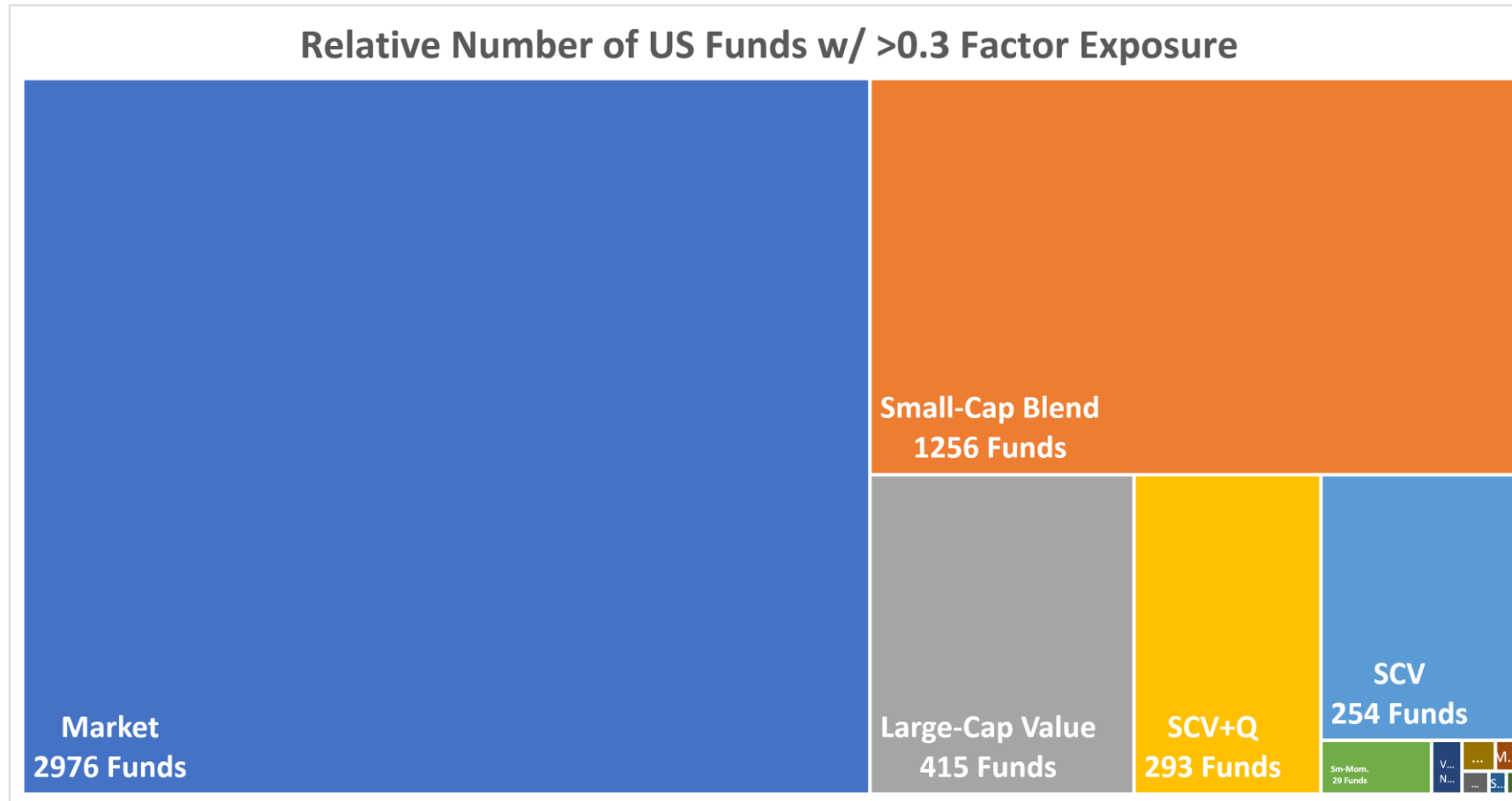


## DFA US Small Cap Value I

### DFA US Small Cap Value I - 12-month Rolling Excess Return



# Not all factors equally available



## 2 Funds for Life, Fixed Allocation, Lump Sum, Annually Rebalanced, Fine-Tuning Table

Target Date Fund Years to Retirement:		25 (Or More) e.g., 2050 TDF	20 e.g., 2045 TDF	15 e.g., 2040 TDF	10 e.g., 2035 TDF	5 e.g., 2030 TDF	0 e.g., 2025 TDF	-7 (Or Less) e.g., 2015 TDF
Simplified TDF Allocations	TDF Total US Stock Allocation	54%	49.5%	45%	40.5%	36%	30%	18%
	TDF International LCB Stock Allocation	36%	33%	30%	27%	24%	20%	12%
	TDF Int.-Term Gov't Bonds Allocation	10%	17.5%	25%	32.5%	40%	50%	70%
0% US SCV, 100% TDF	Nominal CAGR / Worst 10-Yr. CAGR	9.8% / 1.1%	9.6% / 1.8%	9.4% / 2.4%	9.2% / 3.0%	9.0% / 3.5%	8.7% / 4.2%	8.0% / 3.4%
	Annualized CAGR SD (Volatility)	13.4%	12.4%	11.3%	10.3%	9.3%	8.1%	6.0%
	Worst Drawdown (Peak to Valley)	-48%	-44%	-40%	-36%	-31%	-25%	-17%
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10% US SCV, 90% TDF	Nominal CAGR / Worst 10-Yr. CAGR	10.3% / 1.9%	10.2% / 2.5%	10.0% / 3.0%	9.8% / 3.6%	9.6% / 4.0%	9.4% / 4.6%	8.7% / 4.2%
	Annualized CAGR SD (Volatility)	13.8%	12.8%	11.9%	11.0%	10.1%	8.9%	6.8%
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	30-Year Safe Withdrawal Rate	4.0%	4.2%	4.3%	4.5%	4.7%	4.8%	4.8%
40% US SCV, 60% TDF	Nominal CAGR / Worst 10-Yr. CAGR	11.7% / 3.9%	11.6% / 4.3%	11.5% / 4.7%	11.4% / 5.1%	11.3% / 5.4%	11.1% / 5.8%	10.8% / 6.2%
	Annualized CAGR SD (Volatility)	15.5%	14.9%	14.2%	13.6%	13.0%	12.2%	10.7%
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	30-Year Safe Withdrawal Rate	3.8%	4.0%	4.1%	4.3%	4.4%	4.6%	4.9%
50% US SCV, 50% TDF	Nominal CAGR / Worst 10-Yr. CAGR	12.1% / 4.5%	12.0% / 4.9%	12.0% / 5.2%	11.9% / 5.5%	11.8% / 5.8%	11.7% / 6.2%	11.4% / 6.4%
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	30-Year Safe Withdrawal Rate	3.6%	3.7%	3.9%	4.0%	4.1%	4.3%	4.7%
100% US SCV	Nominal CAGR / Worst-10Yr CAGR: 13.9% / 4.2% (-9.8% in 1928)                         Annualized CAGR SD: 20.6%                         Worst Drawdown: -61%                         30-Year SWR: 2.5%							

Sources & Assumptions: Assumes fixed asset class allocations, lumpsum investment, w/ annual rebalancing, for January 1970 through December 2022 returns. Safe withdrawal rates calculated with 1928-2022 annual returns.

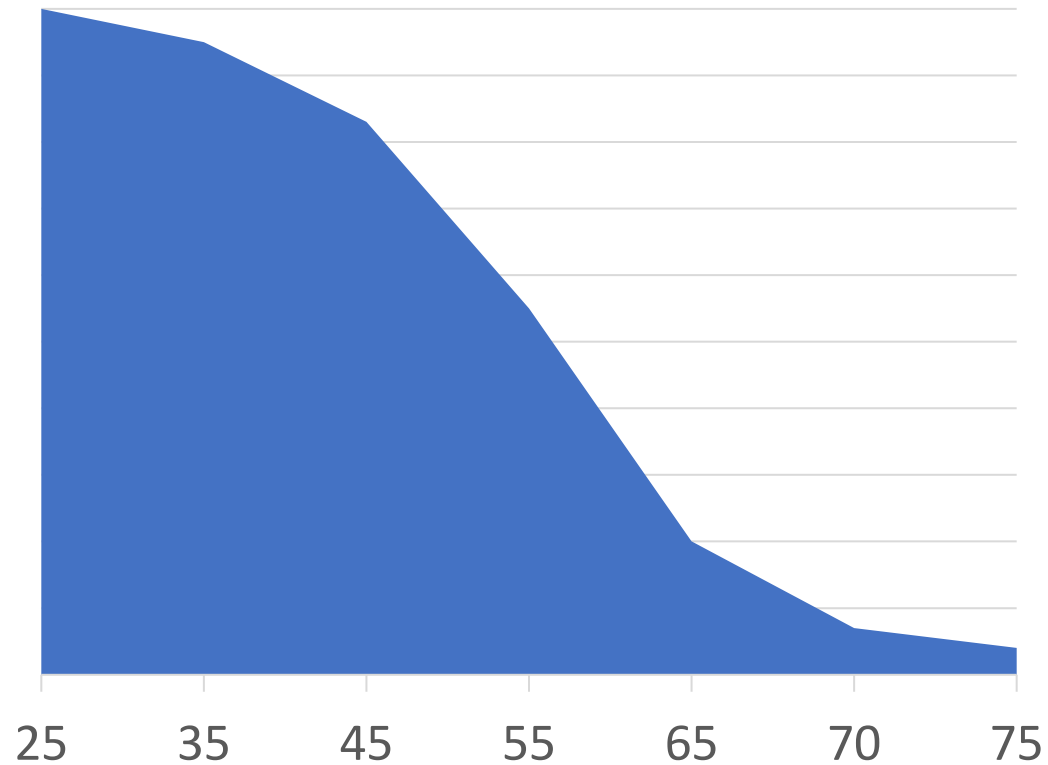
US Stock allocation modeled with US total market returns. International stock allocation modeled with International Large Cap blend. Bond allocation modeled with US Intermediate-term Government bonds.

- Young investors who contribute regularly will likely see lower drawdowns while contributions are large relative to account balance.
  - Investors who rebalance less frequently will likely see higher returns and higher drawdowns.
  - Real returns (adjusted for inflation) were about 3-4% less than the nominal returns shown.
- Past performance doesn't guarantee future returns. Drawdowns from 1928-1970 were worse by an additional 10% to more than 30%.

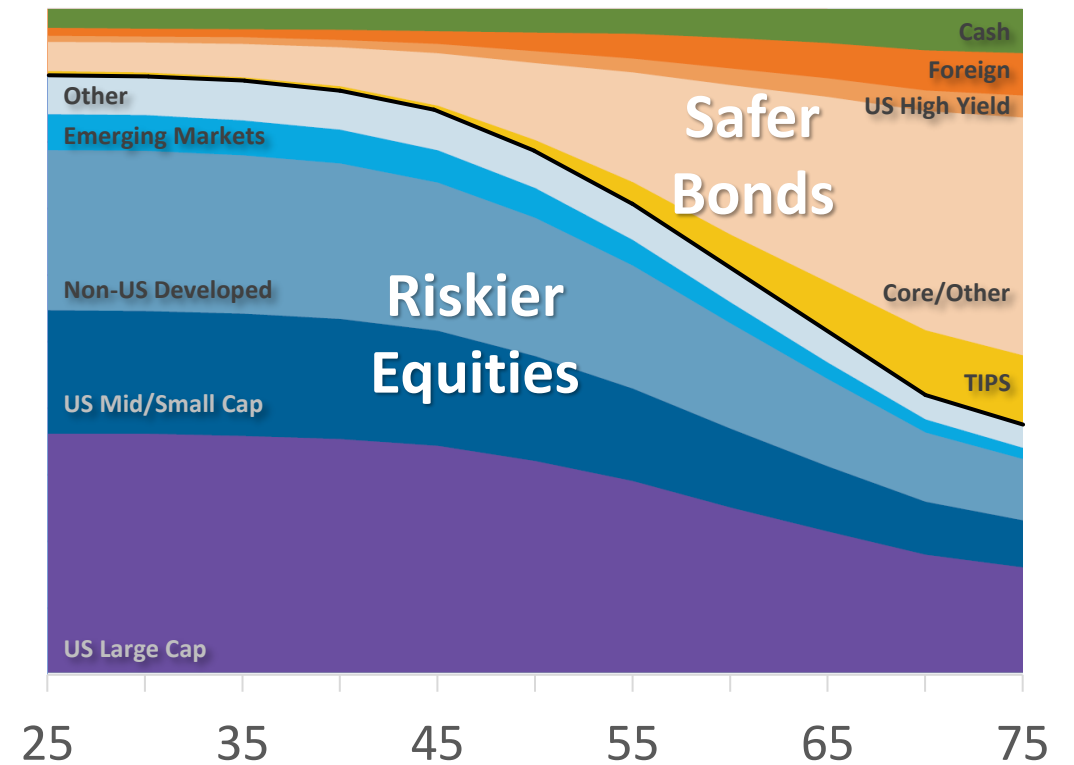
**~60/40  
Eq./FI**

# Risk Versus Age

Human Capital vs. Age



Industry Average TDF Glidepath



Sources: Morningstar 2015 Target-Date Fund Landscape & 2013 Target-Date Series Research Paper



# Why Target-Date Funds Matter

- “**Ninety-six percent** of plans offered target-date funds at year-end 2022”
- “**Eighty-three percent** of all participants used target-date funds, and
- “**Seventy-one percent of them** had their entire account invested in a single target-date fund in 2022.”