No Portfolio is an Island:
A Total Wealth Approach to Asset Allocation

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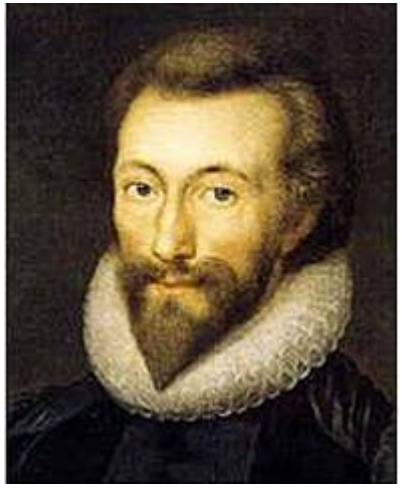
No man is an island,
Entire of itself,
Every man is a piece of the continent,
A part of the main



John Donne, 1624

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Agenda

- The Island View: Traditional Approach to Asset Allocation
- The Continental View: A Total Wealth Approach to Asset Allocation
  - Human Capital
  - Pension Wealth
  - Housing Wealth
- Total Wealth Optimizations
- Extensions
- Conclusions

The Island View of Asset Allocation

The Island View of Asset Allocation

- Isolated focus on financial assets (e.g. stock and bonds)
- Objective: Find most efficient combination of available financial assets

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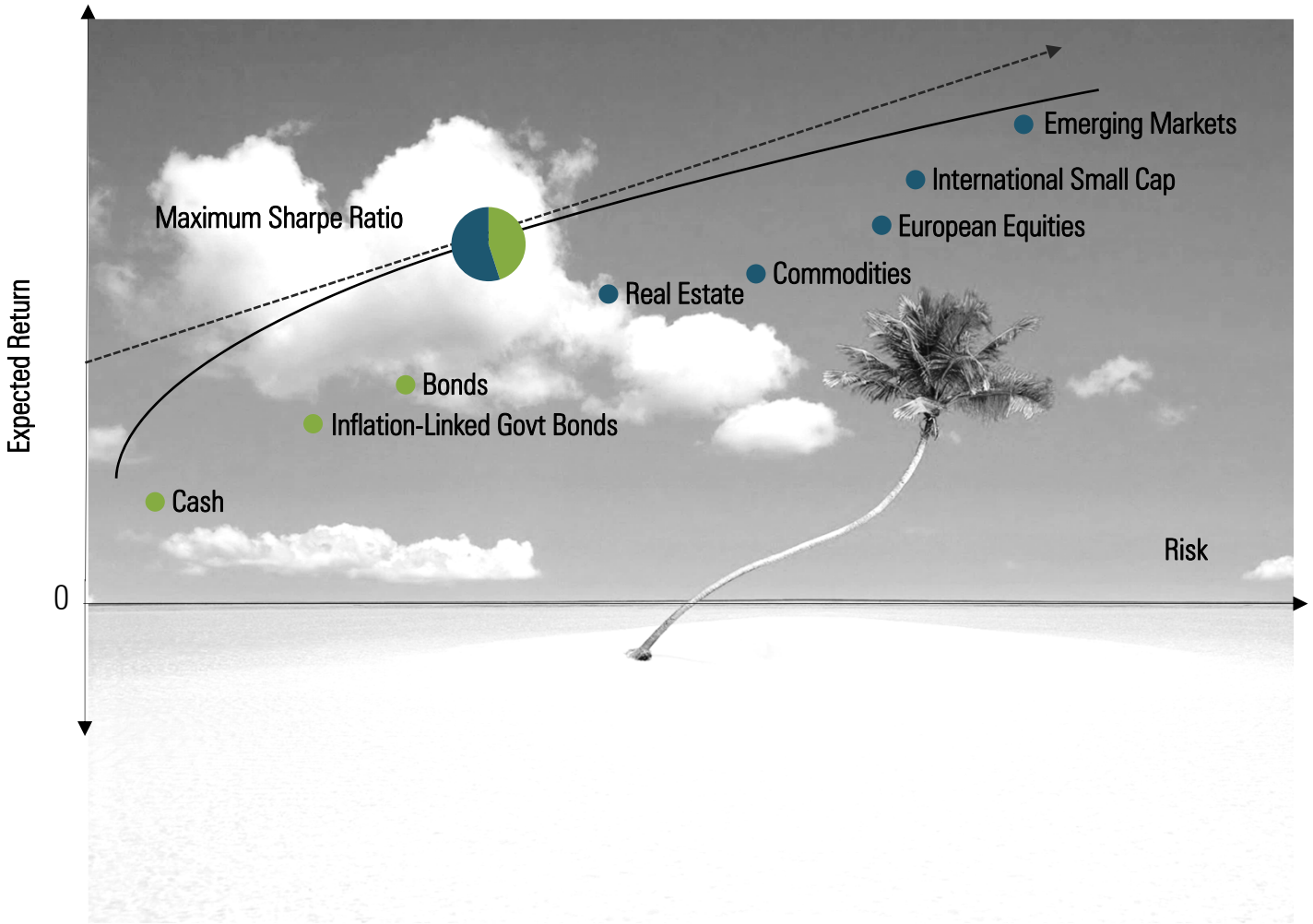
Modern Portfolio Theory: Markowitz's MVO



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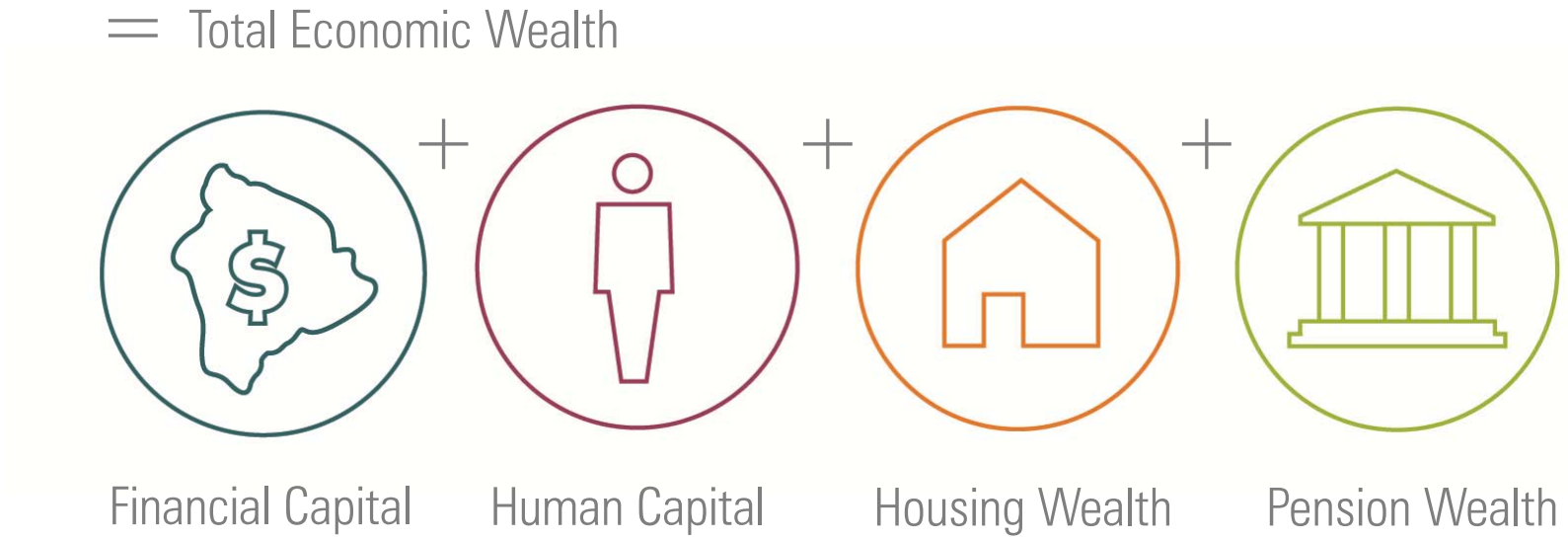
The Continental View of Asset Allocation

The Continental View of Asset Allocation

- Holistic view of each component of individuals' total wealth
- Objective: Find most efficient combination of available financial assets given a person's human capital and outside wealth



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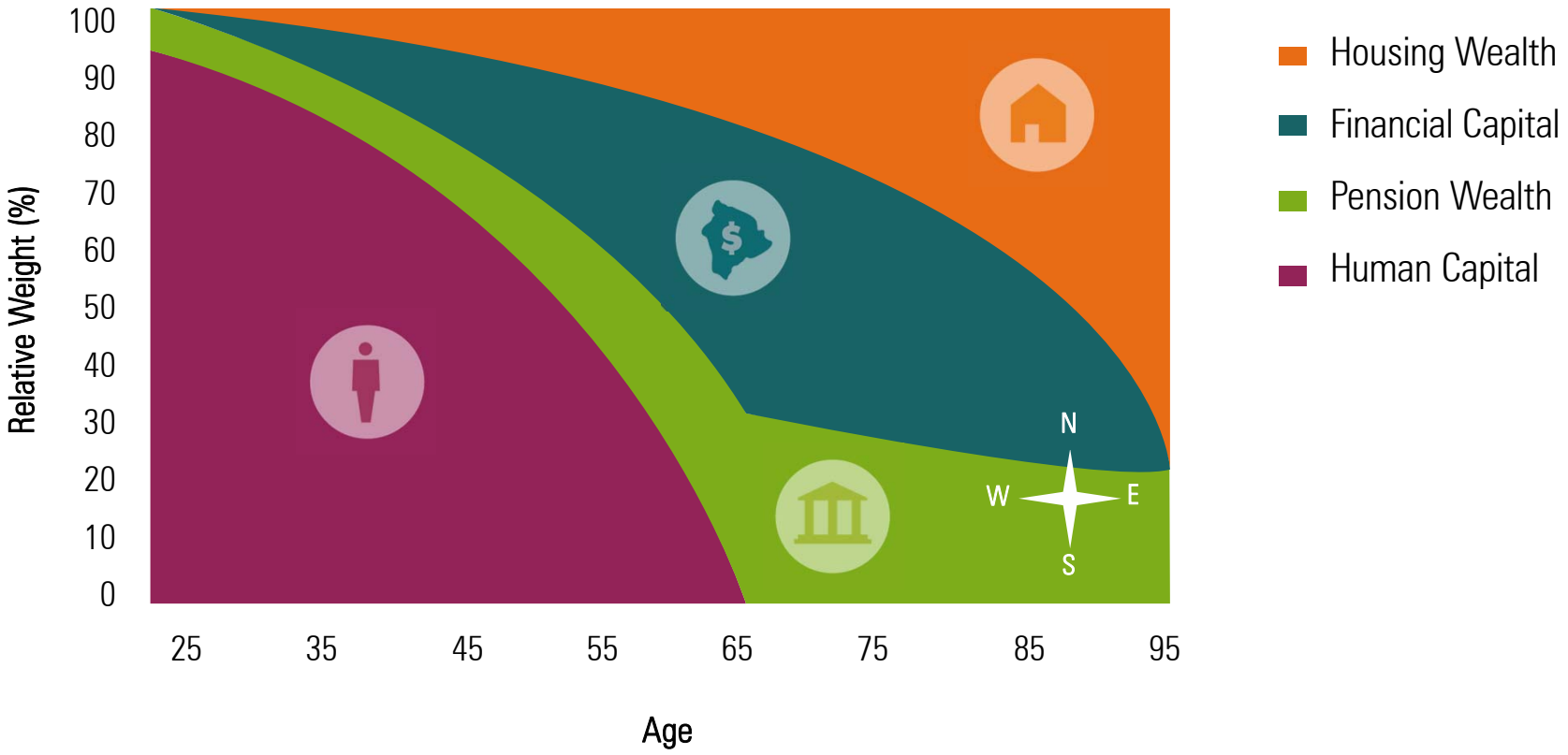
Wealth over the Lifecycle: A Continent, Not an Island



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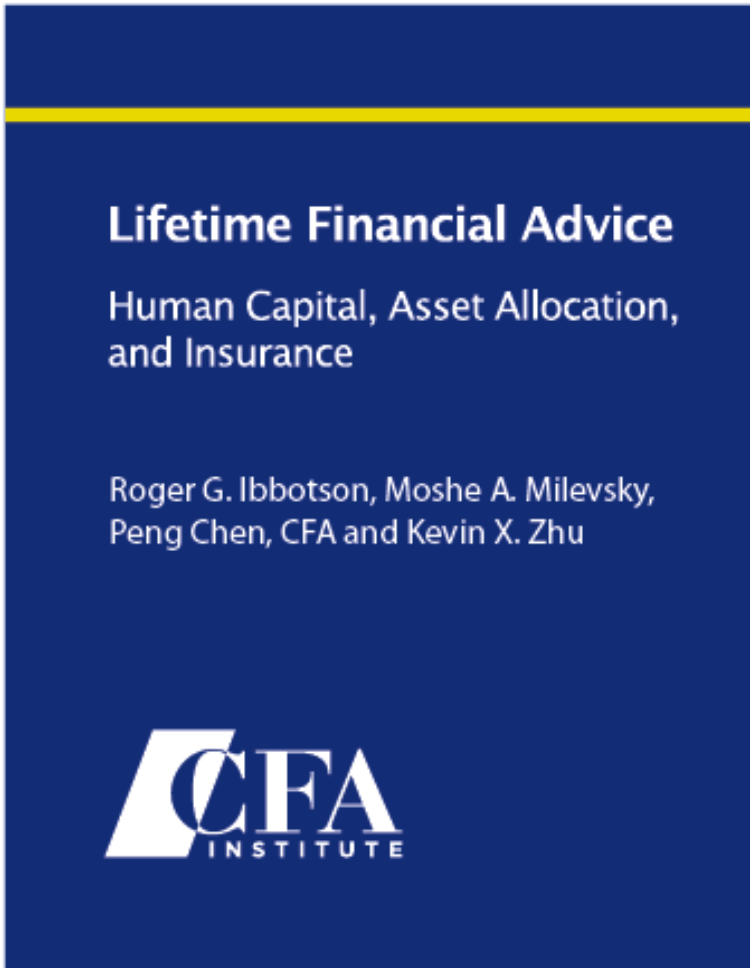
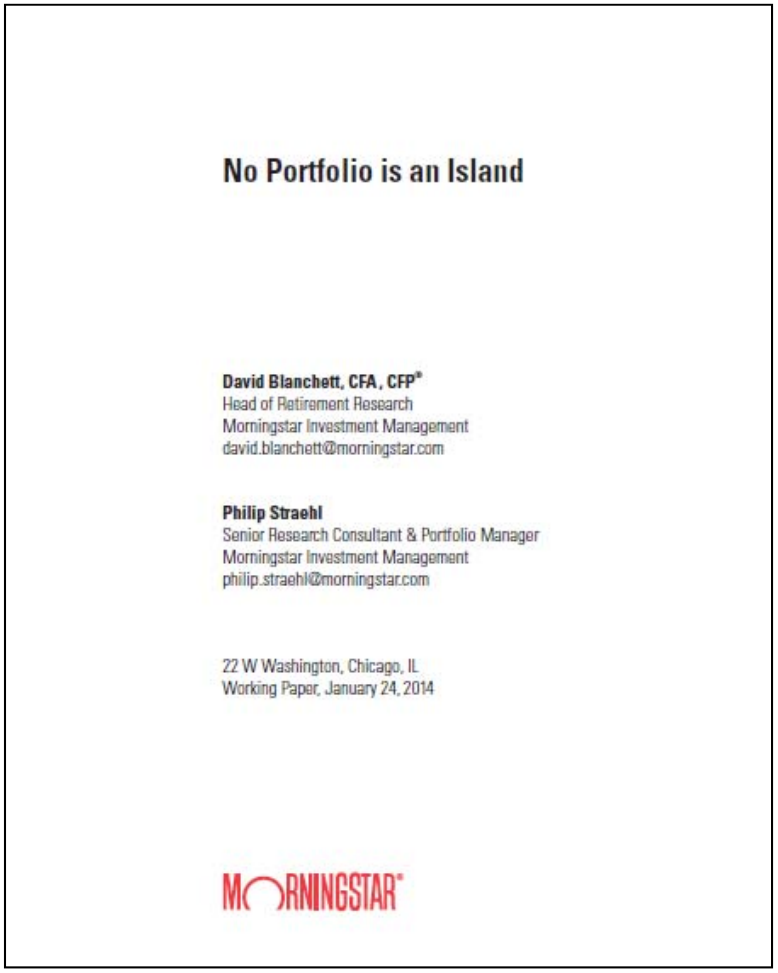
Existing Total Wealth Research



White Paper



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22 W Washington, Chicago, IL
Working Paper, January 24, 2014

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Human Capital

Other Proponents of Human Capital

- *Human capital theory supports a significant commitment to equities for young individuals, declining to a more modest allocation as one approaches retirement and eventually leave the workforce.*

  – Vanguard's Approach to Target-Date Funds

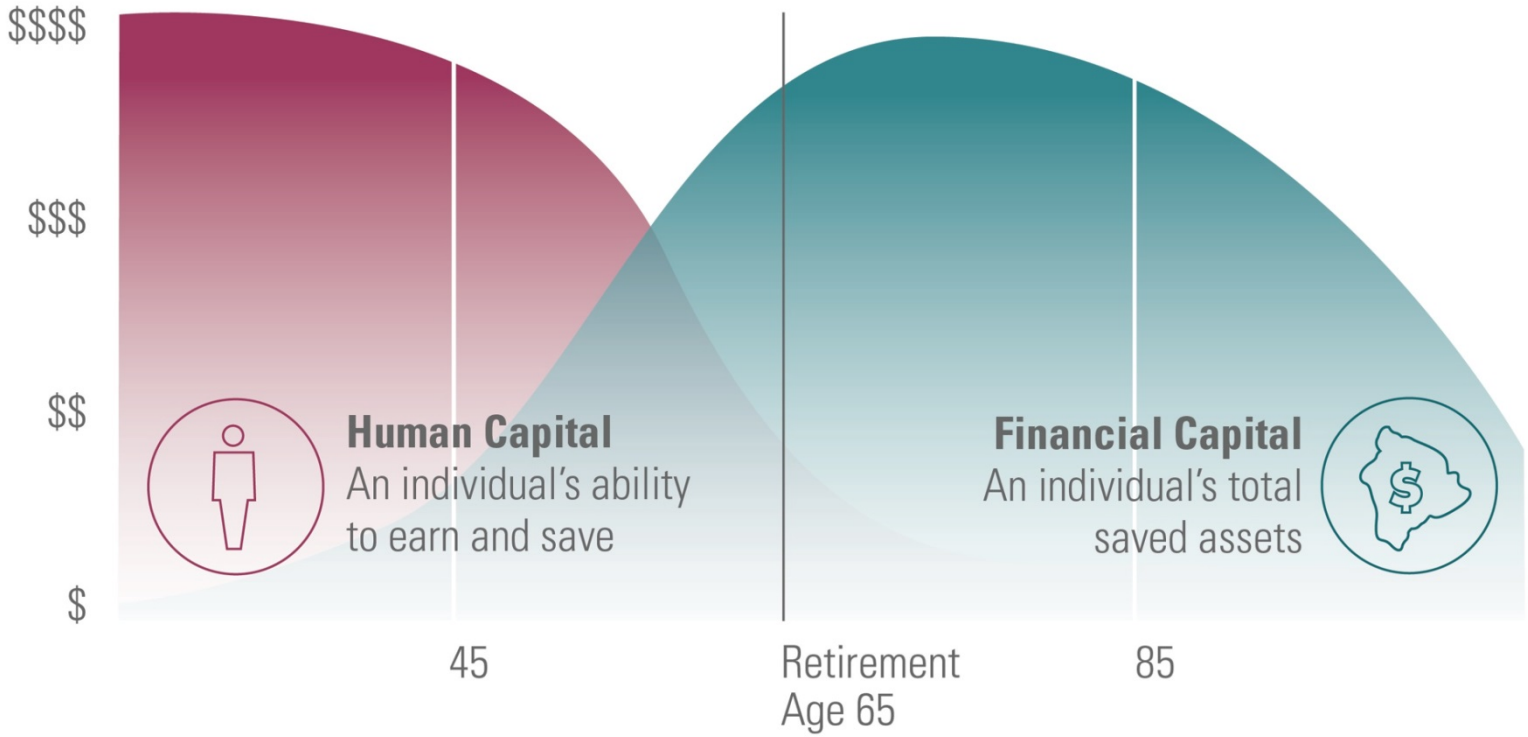
- *We consider participants' ability to earn income and save—their human capital—to be a critical component of their total portfolio.*

  – SSgA Custom Target Date Funds

- *For a vast majority of households, human capital and its role in an investor's wealth are critically important.*

  – Merrill Lynch Target Date Asset Allocation Methodology

Typical Life Cycle of Human Capital and Financial Capital



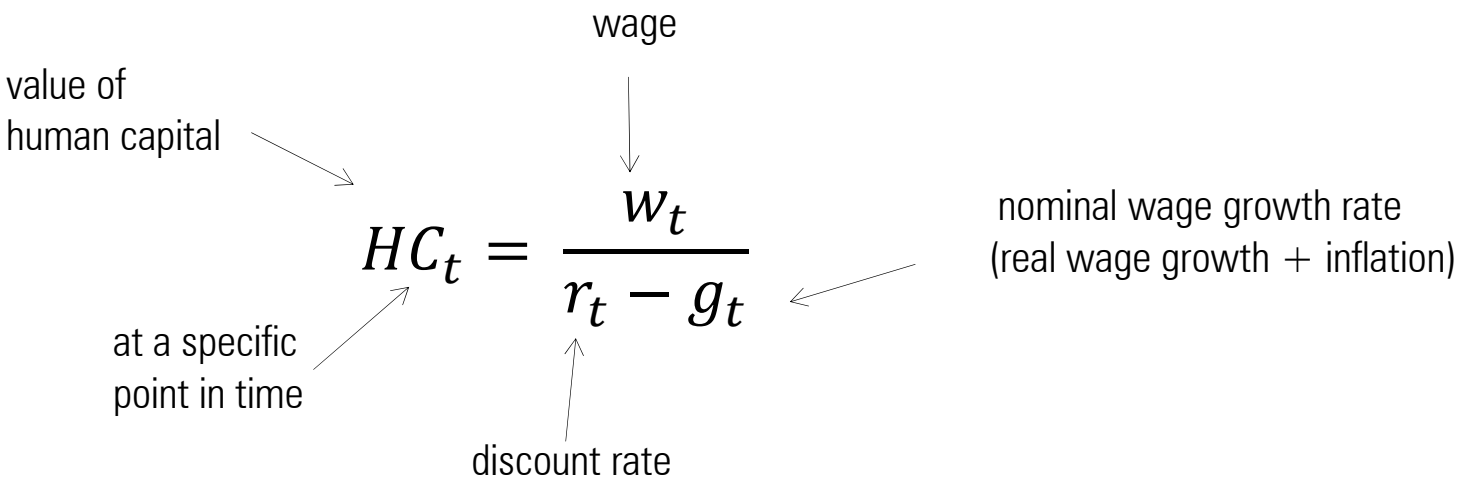
For illustrative purposes only

Human Capital is a Big Deal

- Human capital represents the **largest share of wealth in the economy**, between 60% and 95% depending on the study
- Campbell (1996) estimates **two thirds of GNP goes to labor** vs one third to capital
- Becker (1993) estimates the value of human capital to be **at least four times as large as** the value of stocks, bonds, housing and **all other assets combined**
- **Mayers' (1973) and Roll's (1977) critique of the CAPM** focuses on the fact that common **market benchmarks do not include all assets**, such as human capital
- We cannot observe the aggregate value or dynamics of human capital directly; we merely observe wages, human capital's dividends

Estimating the Value of Human Capital

- Models used to estimate the value of human capital generally view earnings as a of "dividend" from the individual's total human capital
- Therefore, dividend growth models can be used to estimate the total value of human capital (e.g., the Gordon growth model)



Discount Rates Vary by Time and Industry

		Month (%)		
Industry	Bond Proxy	1993 – 03	2009 – 03	2013 – 03
Construction	Barclays IG Building Materials	7.77	13.23	4.18
Finance	Barclays IG Banking	7.96	9.96	3.50
Government	Barclays Investment Grade	7.21	8.53	3.49
Healthcare	Barclays IG Health Care	7.15	7.12	3.26
Lodging	Barclays IG Lodging	8.07	13.63	3.86
Manufacturing	Barclays IG Div Manufacturing	7.81	7.16	3.15
Mining	Barclays IG Metals & Mining	8.21	9.81	4.08
Real Estate	Barclays IG REITs	7.77	14.46	3.81
Transport	Barclays IG Transport	8.18	7.75	3.51
Utilities	Barclays IG Utility	7.64	7.45	3.56

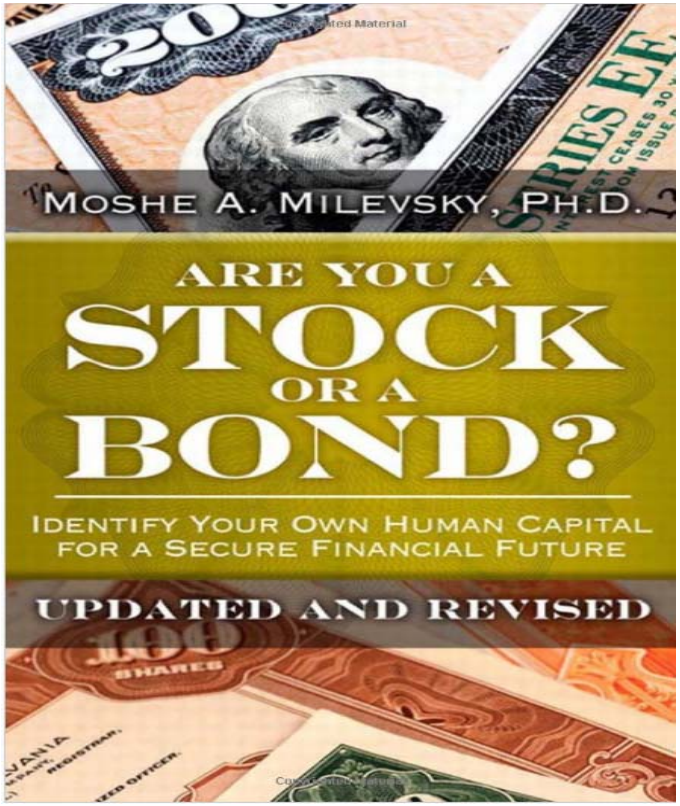
Source: Barclays, Morningstar Direct

Real Wage Growth Expectations Vary by Time and Industry

	Projection Period (%)			
Industry	1992–2005	2002–2012	2012–2022	Average
Construction	1.8	1.4	2.6	1.5
Finance	1.5	1.2	0.8	1.2
Government	-0.4	0.0	-1.6	-0.5
Healthcare	3.0	2.8	2.6	2.7
Lodging	2.6	1.7	0.9	1.7
Manufacturing	-0.2	-0.1	-0.5	-0.4
Mining	-0.9	-1.3	1.4	-0.9
Real Estate	1.8	1.2	1.1	1.5
Transport	1.6	2.0	0.7	1.2
Utilities	1.0	-0.6	-1.1	-0.2
Average	**1.2**	**0.8**	**0.7**	**0.8**

Source: Bureau of Labor Statistics, Morningstar Direct

How Risky is Human Capital?



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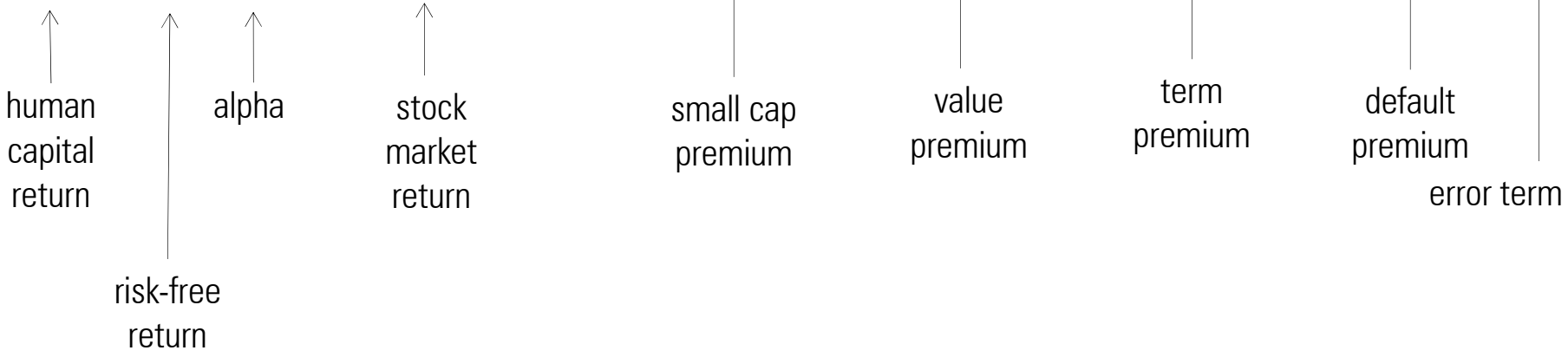
Our Perspective

- In 1998 Ibbotson's advisory council, which included notable economists; such as Roger Ibbotson, Dick Thaler, Danny Kahneman, Harry Markowitz, Jeff Jaffe, John Carroll, and Shlomo Bernartzi determined human capital is similar to a junk bond
- During "normal" times junk bonds trade more like bonds, but during times of economic turmoil junk bonds trade more like equities
- It was established that human capital would modeled as 30% stocks and 70% bonds for the advice engine
    - Our research allows us to test this theory!

Estimating the Riskiness of Human Capital

- The five factor model introduced by Fama and French (1993) is used to estimate the market risk of human capital

$$R_{HC} - R_f = \alpha + B_1(R_{Mkt} - R_f) + B_2(SMB) + B_3(HML) + B_4(TERM) + B_5(DEF) + \varepsilon$$



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Regression Coefficients

Industry-Specific Human Capital

		Cons	Fin	Govt	Health	Lodge	Manu	Mine	RE	Transp	Util	Avg
	α	-0.51	-0.66	-0.56	-0.65	-0.40	-1.19**	0.23	-0.36	-0.71	-0.92*	-0.57
Mkt	β1	0.39***	0.22**	0.05	0.29***	0.46***	0.12*	0.28***	0.40***	0.25***	0.14**	0.26
SMB	β2	-0.06	-0.01	-0.03	0.17	0.30	0.04	-0.15	0.04	0.04	0.02	0.03
HML	β3	0.41***	0.30***	0.12*	0.20*	0.20	0.18**	0.38***	0.46***	0.20**	0.20***	0.26
TERM	β4	0.43***	1.11***	0.71***	0.75***	0.40*	0.81***	0.35**	0.35*	0.61***	0.57***	0.61
DEF	β5	0.41	1.57***	0.92***	0.11	0.36	0.40**	0.09	0.53	0.25	0.16	0.48
	R^2	29%	59%	56%	33%	23%	53%	25%	25%	37%	39%	38%

***p< .01, ** .01 < =p< .05, *p <= .1

Relatively bond-like

More stock-like

Source: "No Portfolio is an Island." Morningstar White Paper by David Blanchett and Philip Straehl

Asset Class and Human Capital Correlations

Asset Class	Industry-Specific Human Capital										
	Cons	Fin	Govt	Healt	Lodg	Manu	Mine	RE	Trans	Util	Avg
Cash	-0.02	0.01	-0.07	-0.09	-0.16	-0.01	-0.11	-0.09	-0.03	-0.09	-0.07
InterBond	0.31	0.57	0.69	0.50	0.14	0.64	0.29	0.20	0.52	0.61	0.45
LongBnd	0.31	0.59	0.70	0.52	0.17	0.74	0.33	0.21	0.55	0.65	0.48
TIPS	0.32	0.15	0.35	0.33	0.24	0.35	0.35	0.28	0.28	0.37	0.30
HiYld	0.57	0.34	0.36	0.26	0.67	0.08	0.37	0.65	0.32	0.30	0.39
NnUSBd	0.21	0.38	0.45	0.23	0.12	0.42	0.25	0.16	0.33	0.27	0.28
LarGro	0.24	0.08	-0.05	0.08	0.36	-0.14	0.07	0.25	0.10	-0.10	0.09
LarVal	0.37	0.25	0.08	0.16	0.39	0.01	0.25	0.37	0.23	0.07	0.22
SmGro	0.22	0.08	-0.08	0.10	0.40	-0.14	0.07	0.26	0.10	-0.09	0.09
SmVal	0.34	0.21	0.03	0.17	0.39	-0.02	0.20	0.37	0.21	0.05	0.19
NnUSEq	0.35	0.27	0.08	0.15	0.44	-0.02	0.22	0.39	0.21	-0.01	0.21
Commod	0.25	0.13	0.04	0.04	0.26	-0.04	0.32	0.35	0.01	-0.02	0.14
REITs	0.58	0.40	0.32	0.31	0.50	0.26	0.49	0.60	0.42	0.25	0.41
	0.31	0.27	0.22	0.21	0.30	0.16	0.24	0.31	0.25	0.17	0.24

Source: "No Portfolio is an Island." Morningstar White Paper by David Blanchett and Philip Straehl

Pension Wealth

Pension Wealth

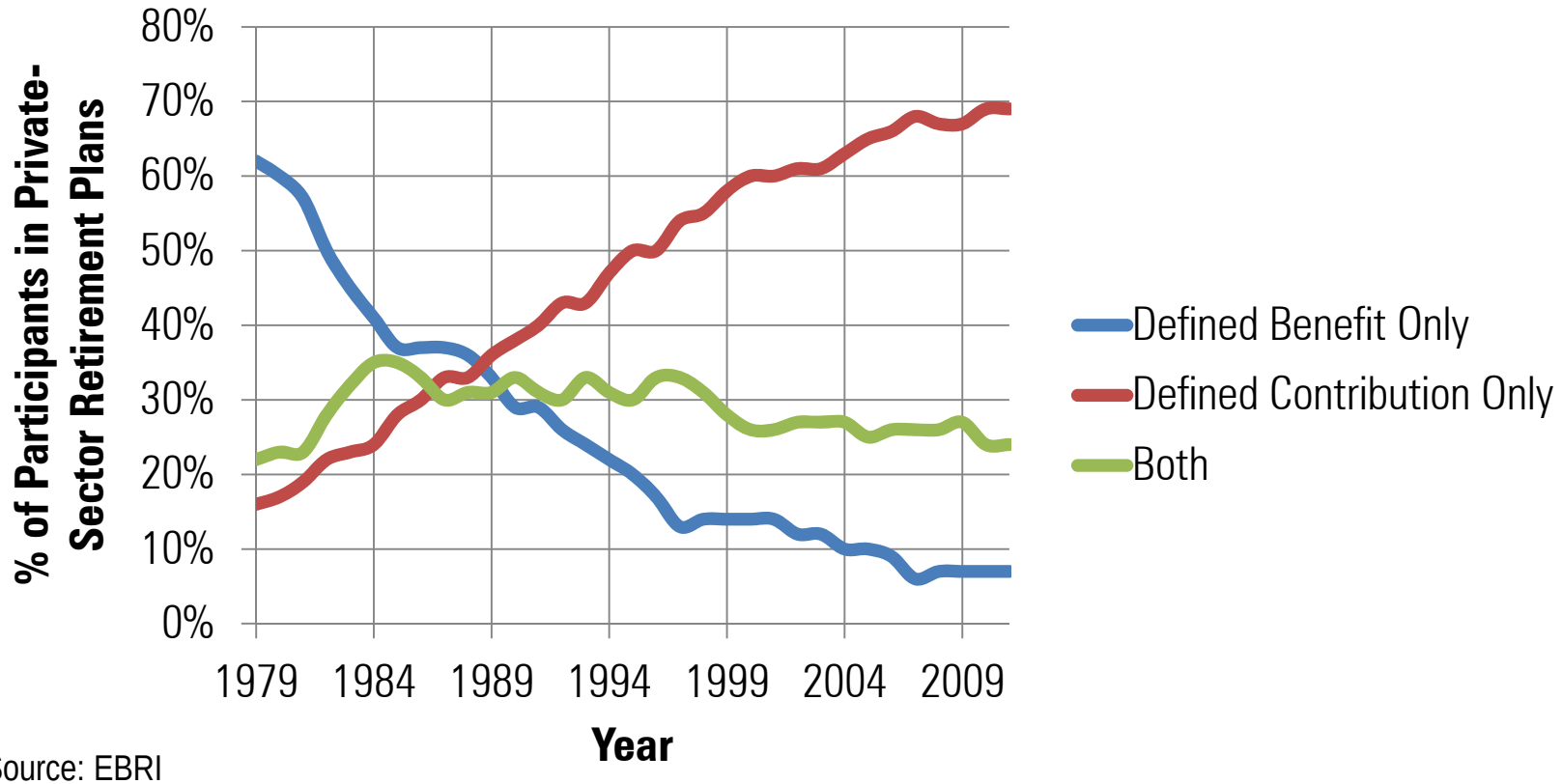
- Nine out of ten individuals age 65 and older receive Social Security benefits and the average monthly benefit is $1,269 based on data obtained from the Social Security Administration website
- Among elderly Social Security beneficiaries, 53% of married couples and 74% of unmarried persons receive 50% or more of their income from Social Security
- Defined benefit pensions also represent a material asset for many Americans; however, this relative share of wealth for defined benefit plans has been declining as they become less popular among plan sponsors

Source: Social Security Administration: http://www.ssa.gov/pressoffice/basicfact.htm as of July 26, 2013

Pensions and Human Capital

- The valuation model for human capital did not include pension benefits (e.g., Social Security retirement benefits)
- Excluding Social Security retirement benefits from human capital effectively assumes they are independent
    - obviously a simplifying assumption
- The relation between human capital and pension benefits will vary by individuals
    - for example, married individuals are entitled to Social Security benefits based entirely on the earnings record of their spouse, and therefore their pension benefits are not based on their own human capital at all

Funding Retirement



Source: EBRI

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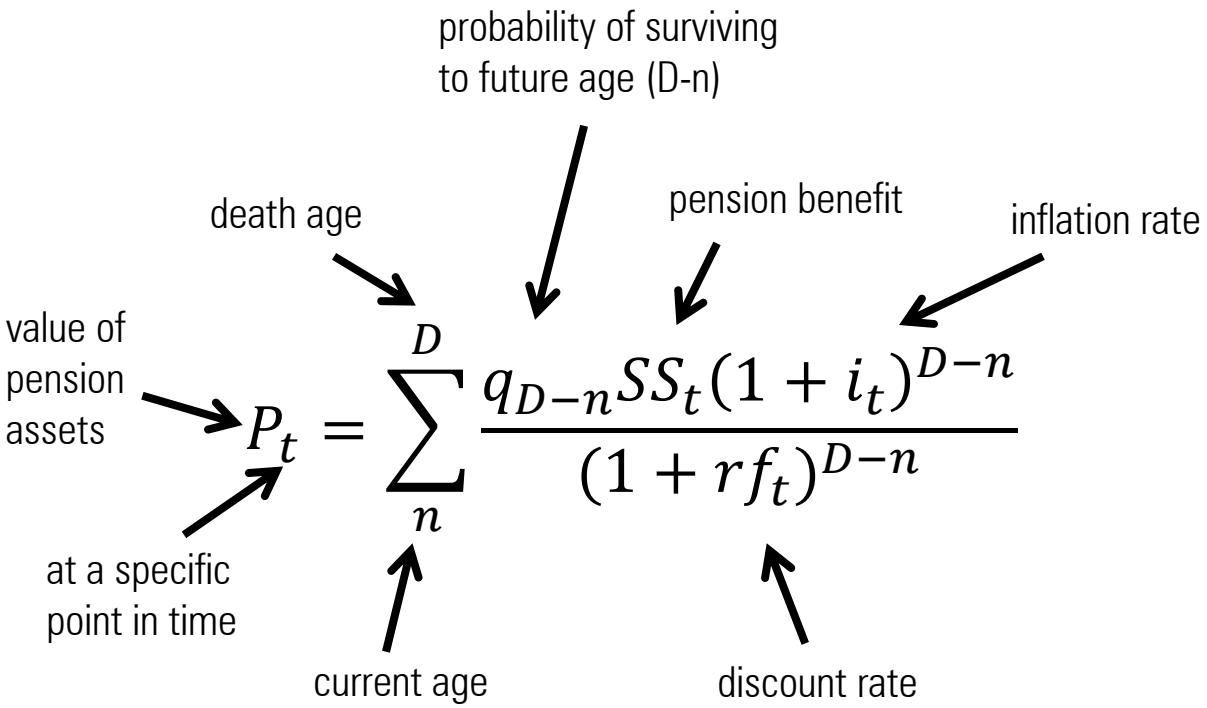
The Value of Pension Assets

- Time varying mortality weighted net present value (similar approach to estimating human capital)



Housing Wealth

Home Ownership

- According to the US Census Bureau, homeownership in the United States was 65.3% as of third quarter of 2013 and has ranged between approximately 63% and 69% since 1965
- According to summary data from the 2010 Survey of Consumer Finances, the primary residence represented 47.4% of all nonfinancial assets for a household and 29.43% of total assets

Housing Leverage

- Homes are generally purchased with a mortgage. As such, a unique feature of housing wealth is that it is typically leveraged
- A 20% down payment implies a five times multiple with respect to how a change in the value of the home will affect the net equity
    - for example, if an individual owns a home worth S100,000 with a mortgage of $80,000, if the house increases in value by 10% (to S110,000) the return realized by the owner, based on the net equity, is 50% (S 10,000/ S 20,000 = 50%)

Housing Data

- S&P/Case-Shiller Home Price Indexes for 10 different cities, with data obtained from the Federal Reserve Bank of St. Louis:
  - Atlanta, Charlotte, Cleveland, Washington DC, Las Vegas, Miami, Minneapolis, Phoenix, Seattle, and San Francisco
- The term "regions" is used because the geographic region is the key distinguishing factor between the different changes in home values
  - while individual cities were selected to represent different regions, states or other characteristics could just have easily been used

Housing Wealth and Asset Prices

Region-Specific Real Estate: Correlations

	Atlanta	Charlotte	Cleveland	DC	Las Vegas	Miami	Minneapolis	Phoenix	Seattle	San Francisco
Large Value Equity	.249**	.182	.246*	.158	.307***	.256**	.203*	.352***	.245**	.296***
High Yield Bond	.260**	.244**	.219*	.225**	.149	.191*	.280**	.291***	.174	.297***

*** p < .01, ** .01 < = p < .05, * p < = .1

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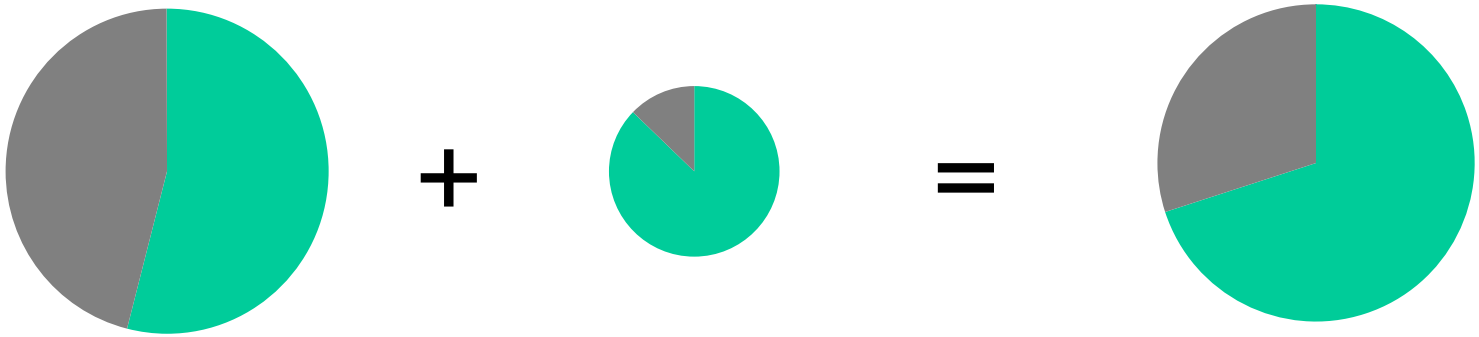
Total Wealth Optimizations

Building More Efficient Portfolios

- The optimal portfolio for an investor should deviate from the market portfolio to the extent that he or she is different from everyone else
- The risks innate to an investor's outside wealth determine "hedging" needs
- Ignoring the risks embedded in investor's outside wealth when building a financial asset portfolio assumes that these risks are uncorrelated with financial assets

Efficient Asset Portfolios from an Individual's Perspective

How Different Are You From the Average?



Market Portfolio

The average investor holds the market portfolio

Individual Outside Wealth Hedge Portfolio

Hedges individual's unique background risks

Optimal Total Wealth Portfolio

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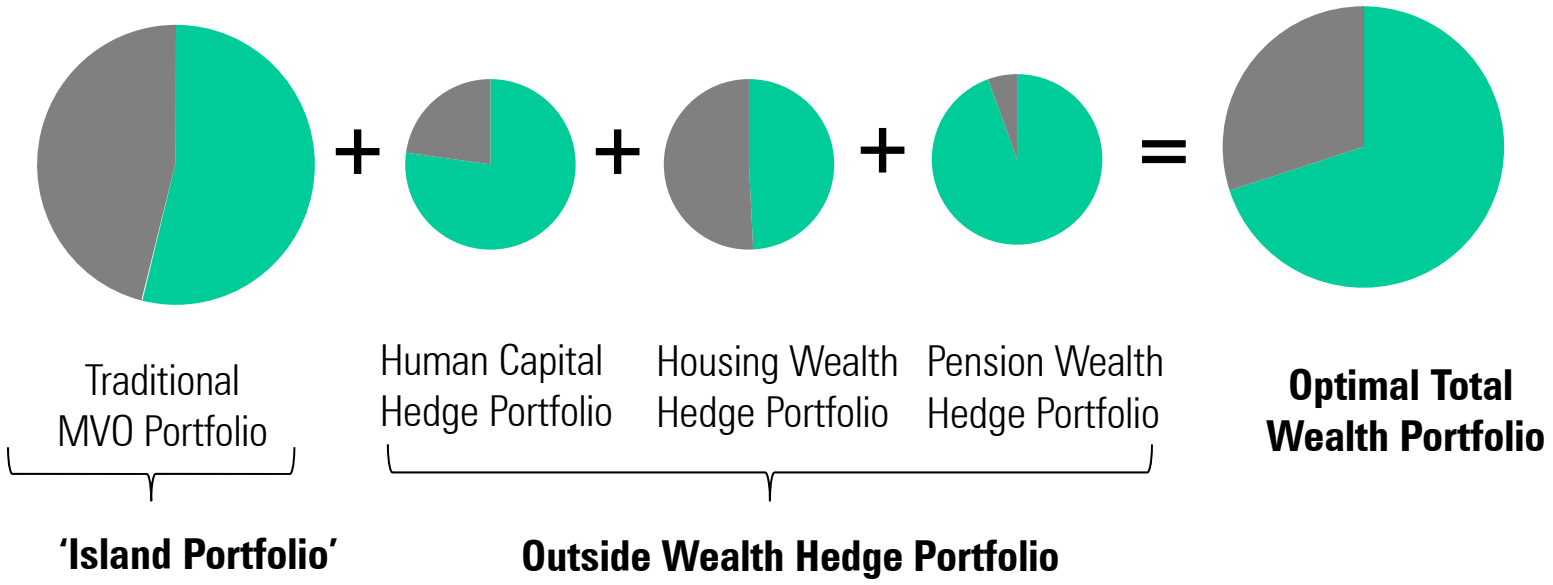
Efficient Asset Portfolios from a Total Wealth Perspective

How is the Total Wealth Portfolio Different from the 'Island Portfolio'?



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Total Wealth Optimization

- Goal: minimize the variance of ***total wealth*** for a given level of return
- Conversely, traditional optimization routines (e.g., MVO) focus entirely on minimizing variance of ***financial wealth*** for a given level of return

Total Wealth Optimization: Empirical Analysis

- **Optimization Objective:** Find portfolio with 8.5% return that minimizes variance of total wealth
- **Opportunity Set:** 13 asset classes
- **Optimization Constraints:**
  - no shorting
  - maximum 20% individual asset class
- **Analysis Period:** 1993-2013

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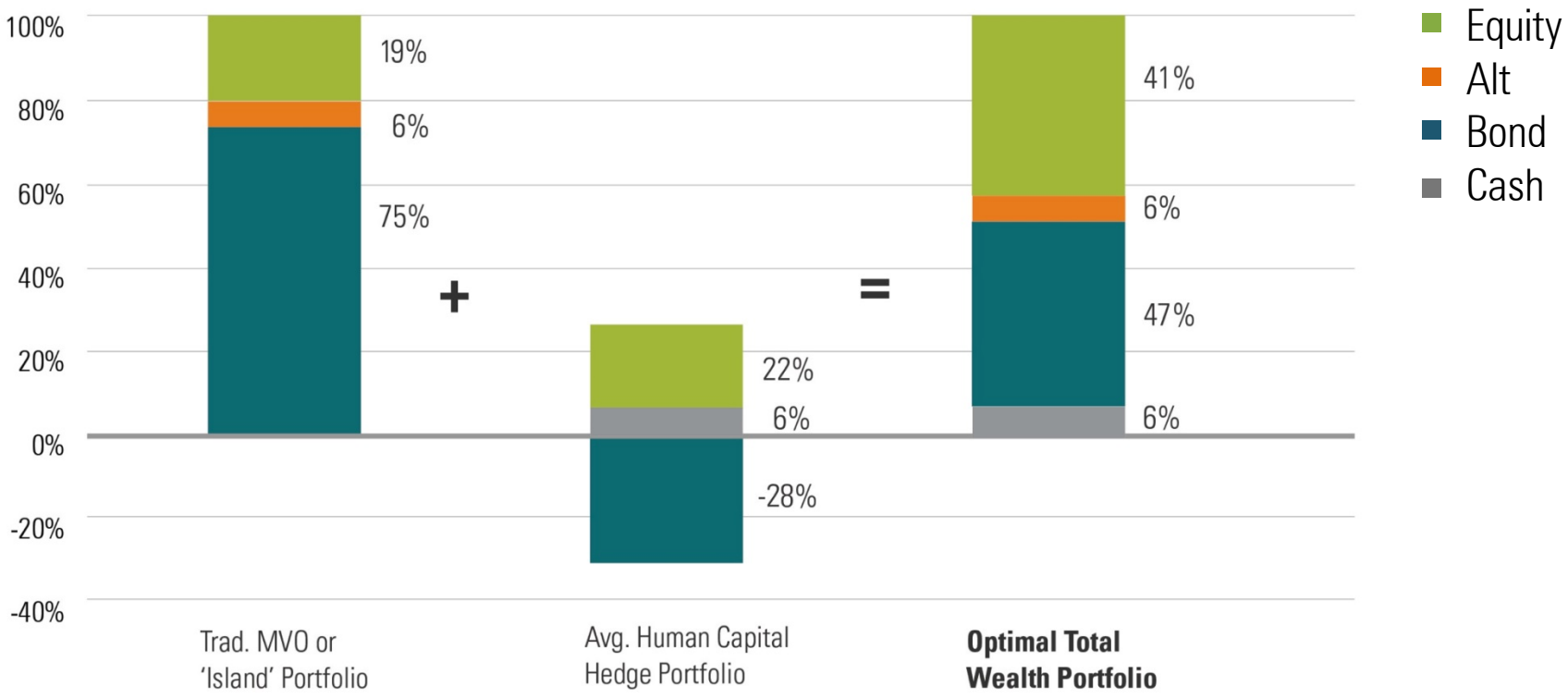
Incorporating Human Capital

Difference to 'Island Portfolio'



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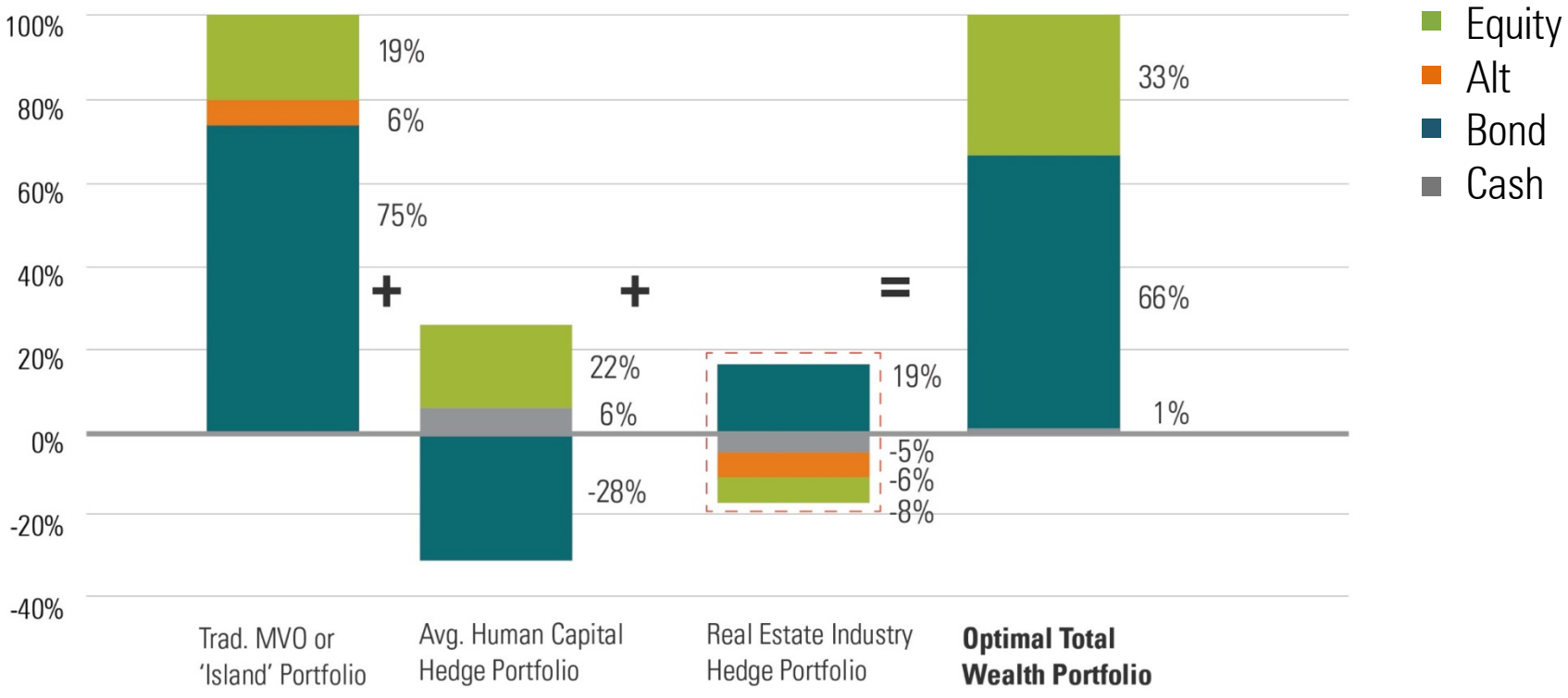
Incorporating Industry-Specific Human Capital (Real Estate)

Difference to Island & Market Portfolio



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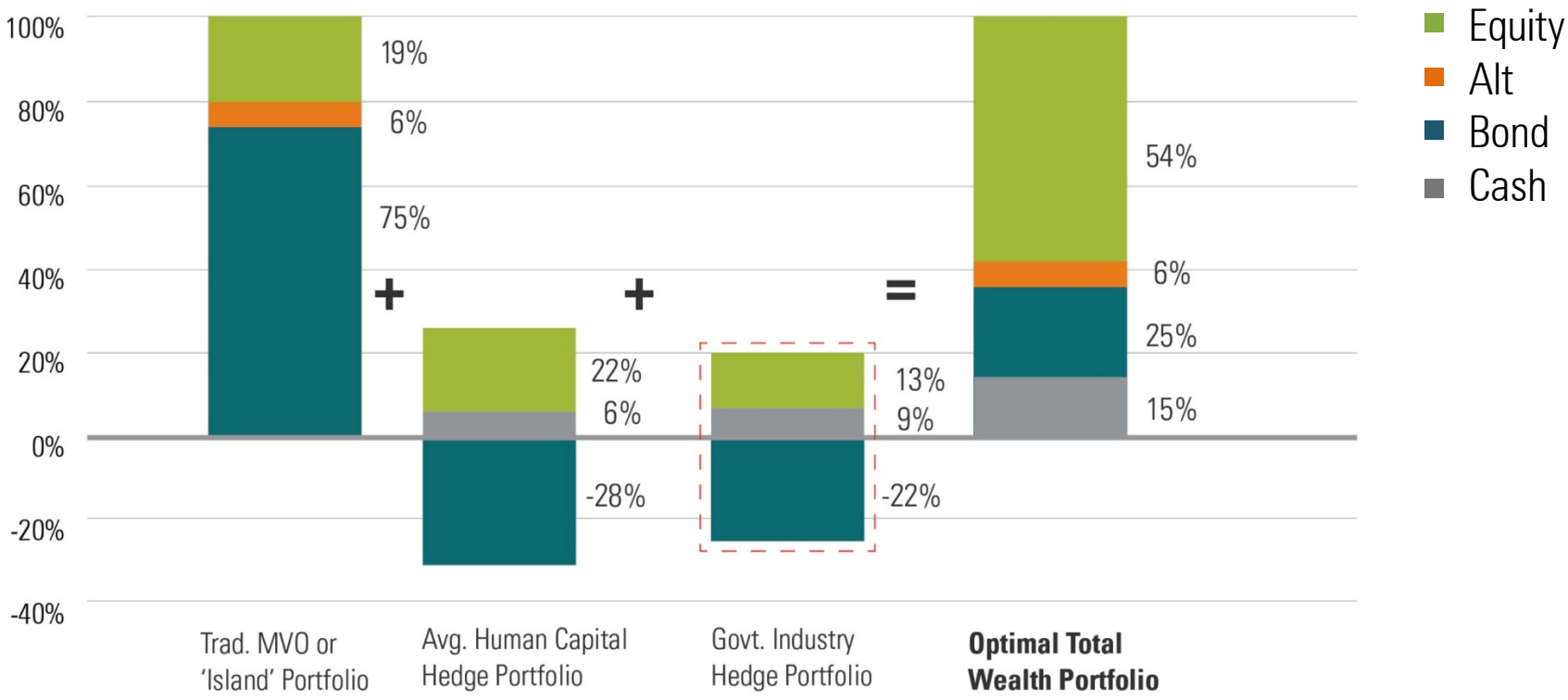
Incorporating Industry-Specific Human Capital (Govt.)

Difference to Island & Market Portfolio



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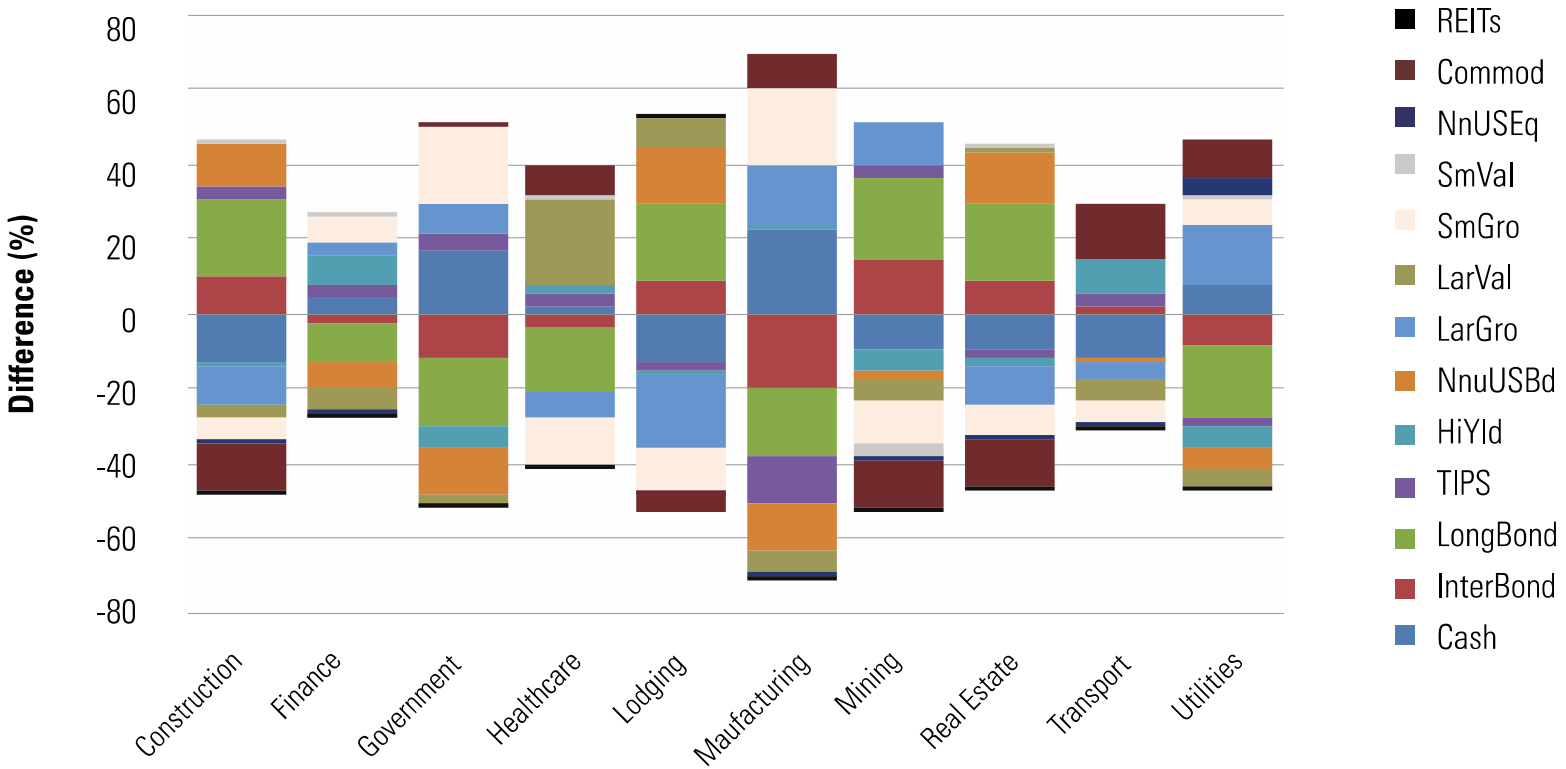
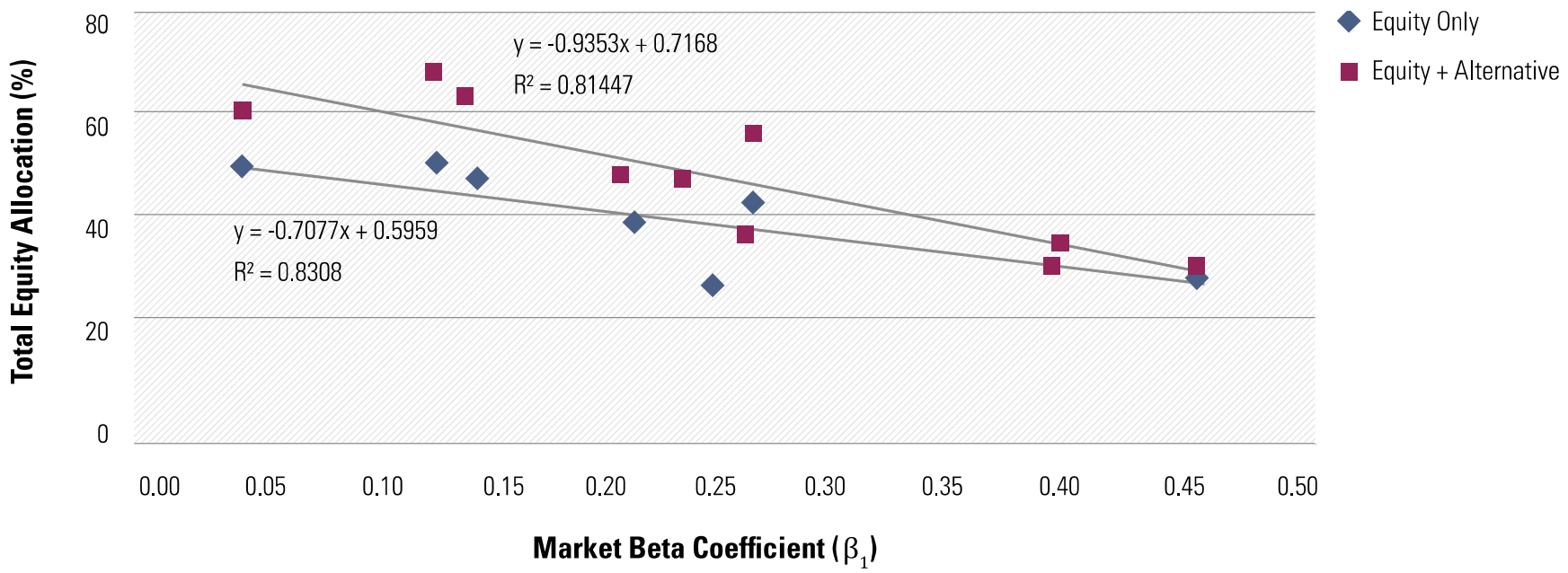
Incorporating Industry-Specific Human Capital

Difference to Market Portfolio



Source: "No Portfolio is an Island." Morningstar White Paper by David Blanchett and Philip Straehl

Relation Between Human Beta and Equity Allocations



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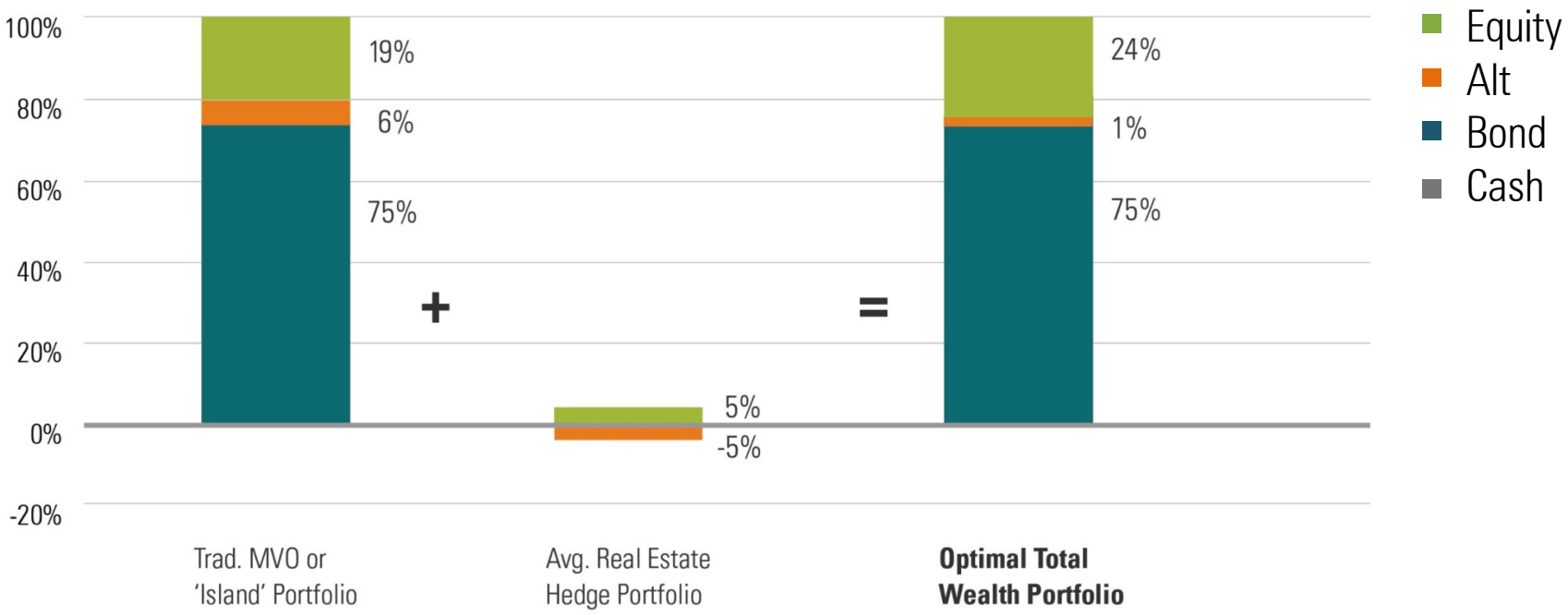
Incorporating Real Estate

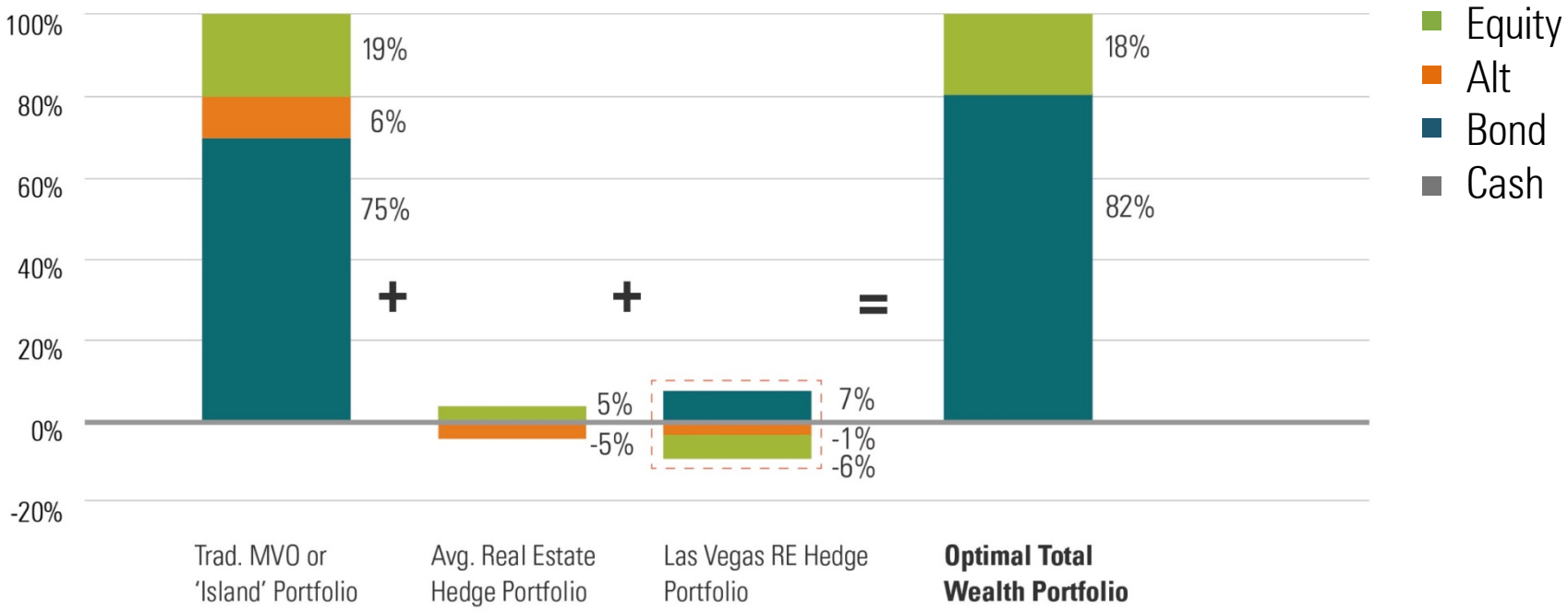
Difference to 'Island Portfolio'



Source: "No Portfolio is an Island." Morningstar White Paper by David Blanchett and Philip Straehl

Incorporating Regional Housing Wealth (Las Vegas)

Difference to Island & Market Portfolio



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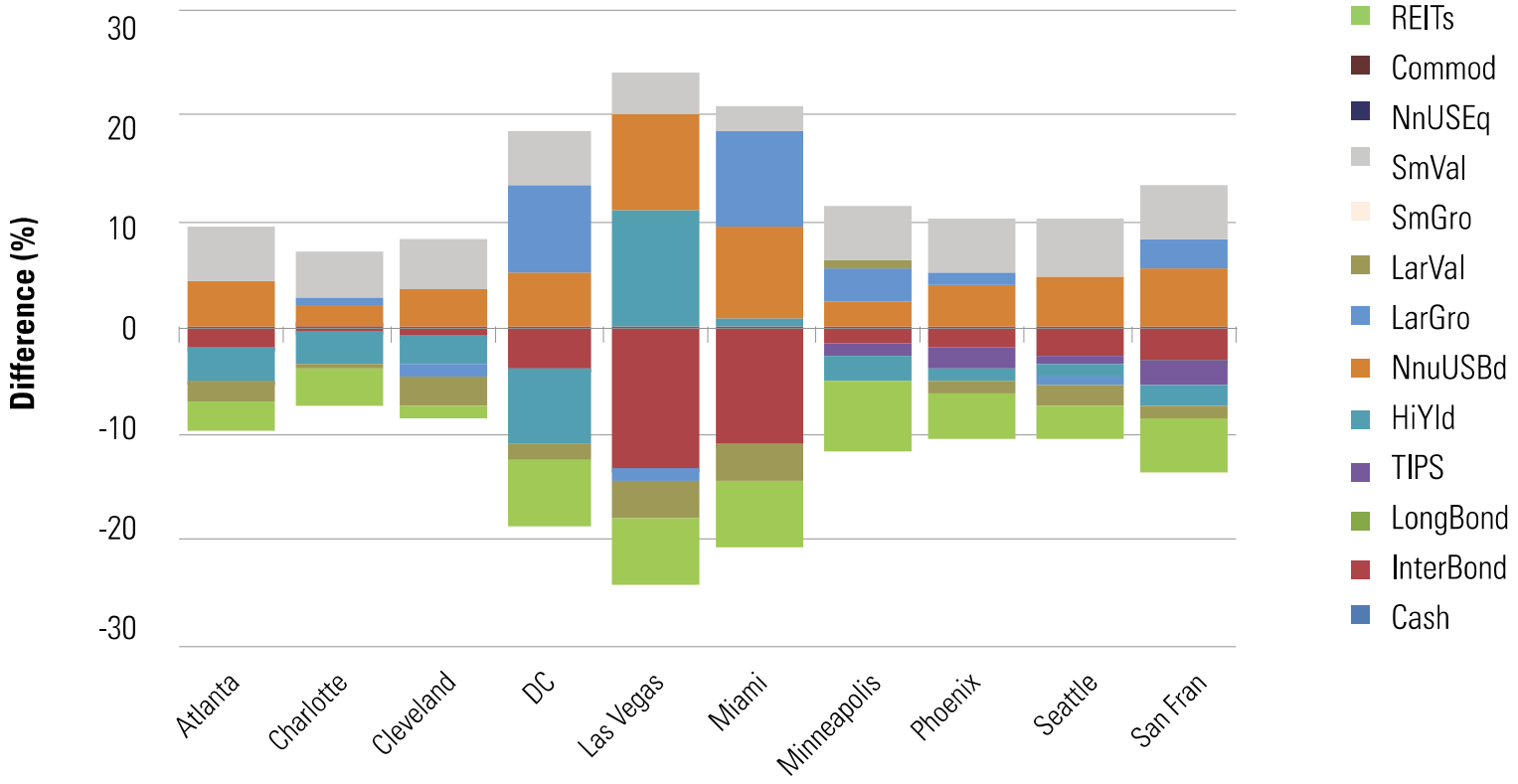
Incorporating Regional Housing Wealth

Difference to 'Island Portfolio'



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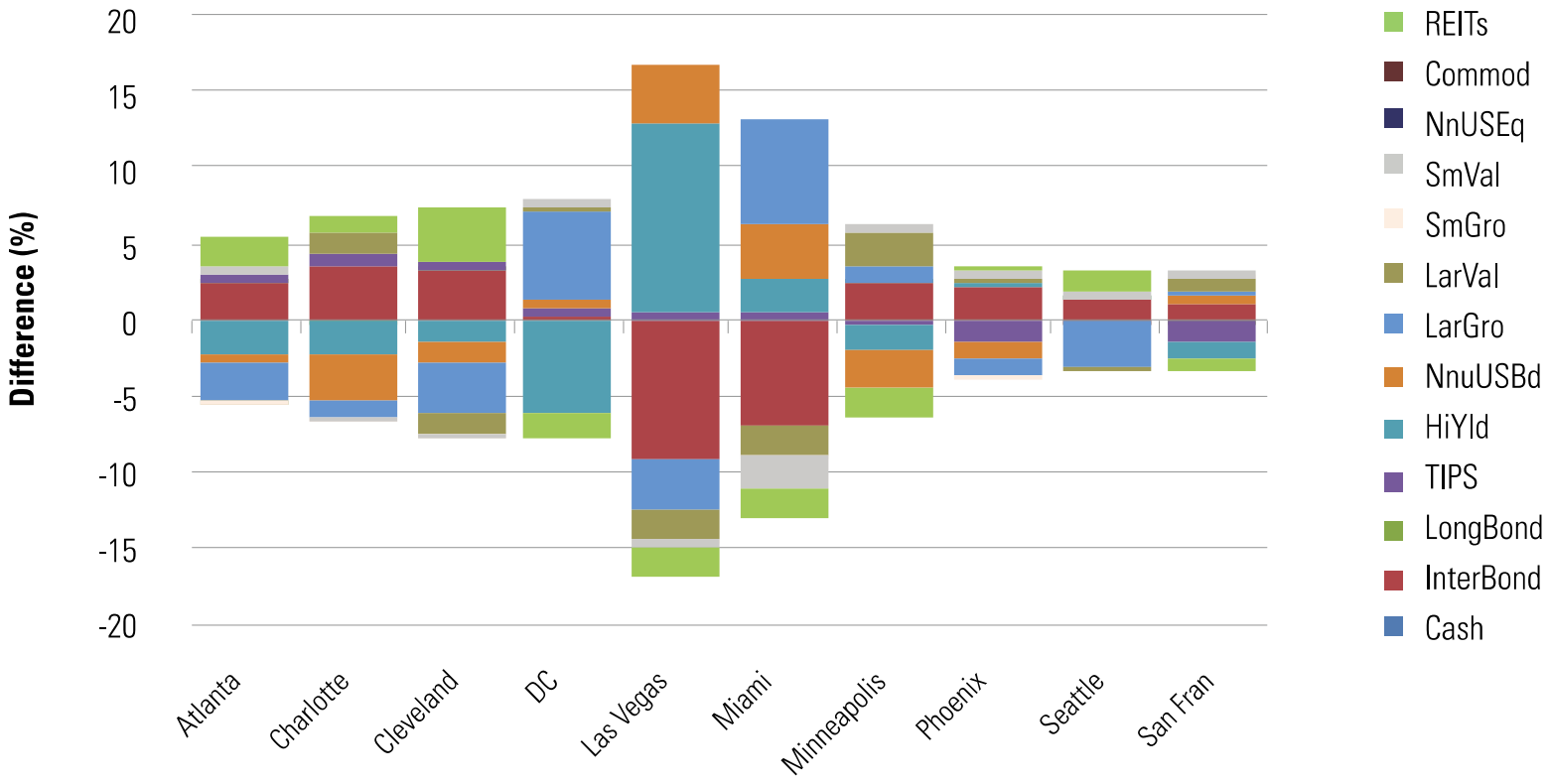
Incorporating Regional Housing Wealth

Difference to Market Portfolio



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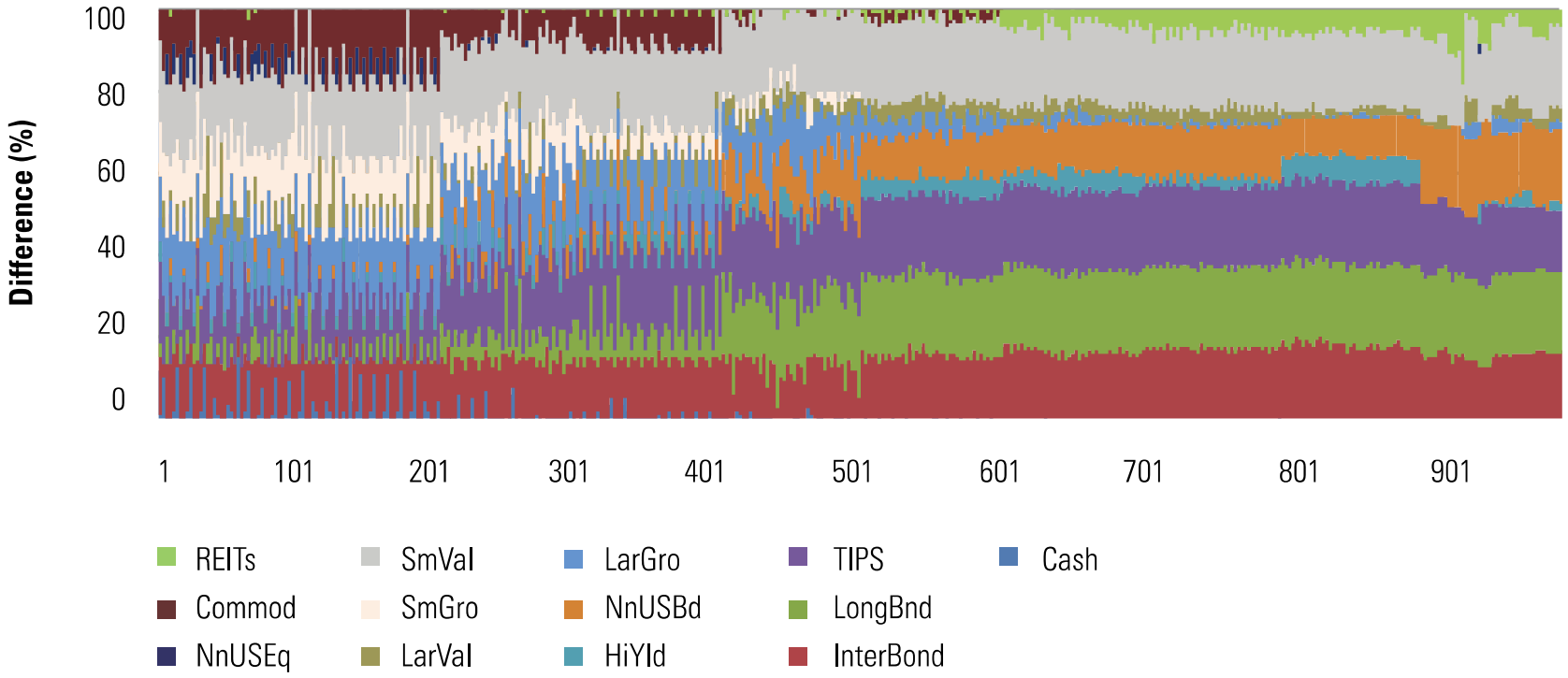
1,000 Test Scenarios

	Scenario Number									
	1	2	3	4	5	6	7	8	9	10
Human Capital	80%	80%	60%	60%	40%	40%	20%	20%	5%	5%
Housing Wealth	5%	0%	15%	0%	30%	10%	20%	5%	15%	30%
Pension Wealth	5%	5%	10%	10%	20%	10%	30%	50%	30%	55%
Financial Capital	10%	15%	15%	30%	10%	40%	30%	25%	50%	10%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Assumed Age	30	30	40	40	50	50	60	60	70	70
Housing Equity	20%	20%	40%	40%	60%	60%	80%	80%	100%	100%
Implied Leverage	5.00	5.00	2.50	2.50	1.67	1.67	1.25	1.25	1.00	1.00

Source: "No Portfolio is an Island." Morningstar White Paper by David Blanchett and Philip Straehl

Optimal Allocations by Scenario Number



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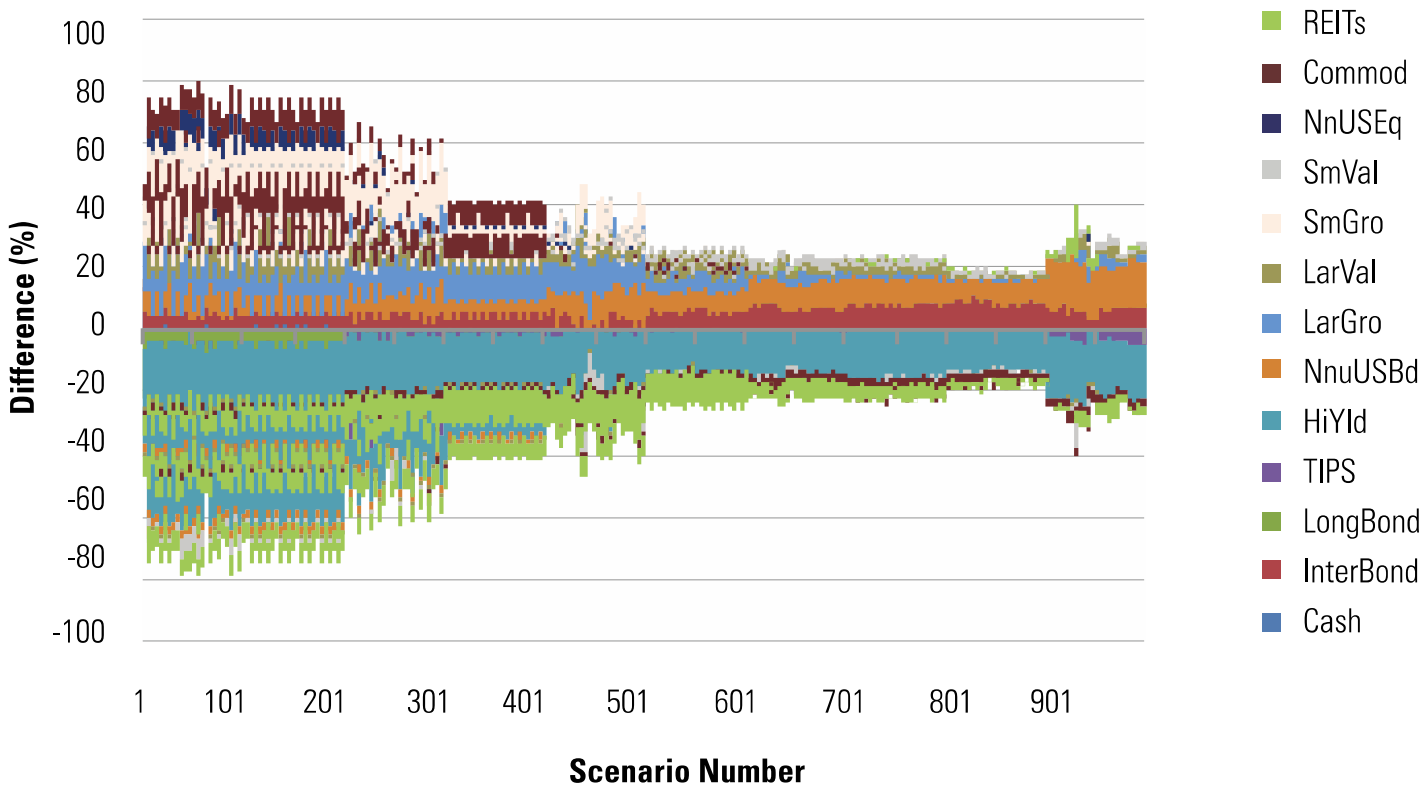
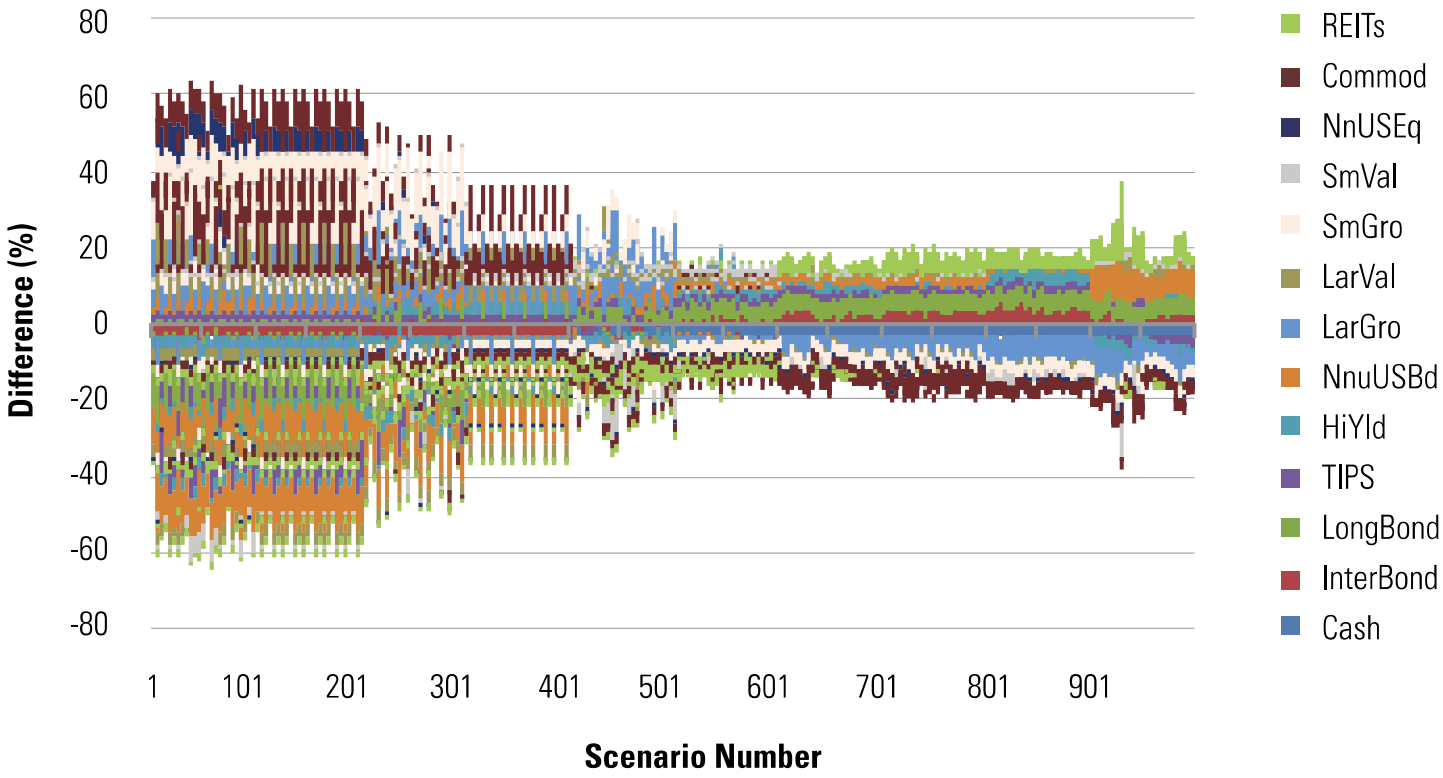
Differences to 'Island Portfolio' by Scenario Number



Source: "No Portfolio is an Island." Morningstar White Paper by David Blanchett and Philip Straehl

Difference to Market Portfolio by Scenario Number



Source: "No Portfolio is an Island." Morningstar White Paper by David Blanchett and Philip Straehl

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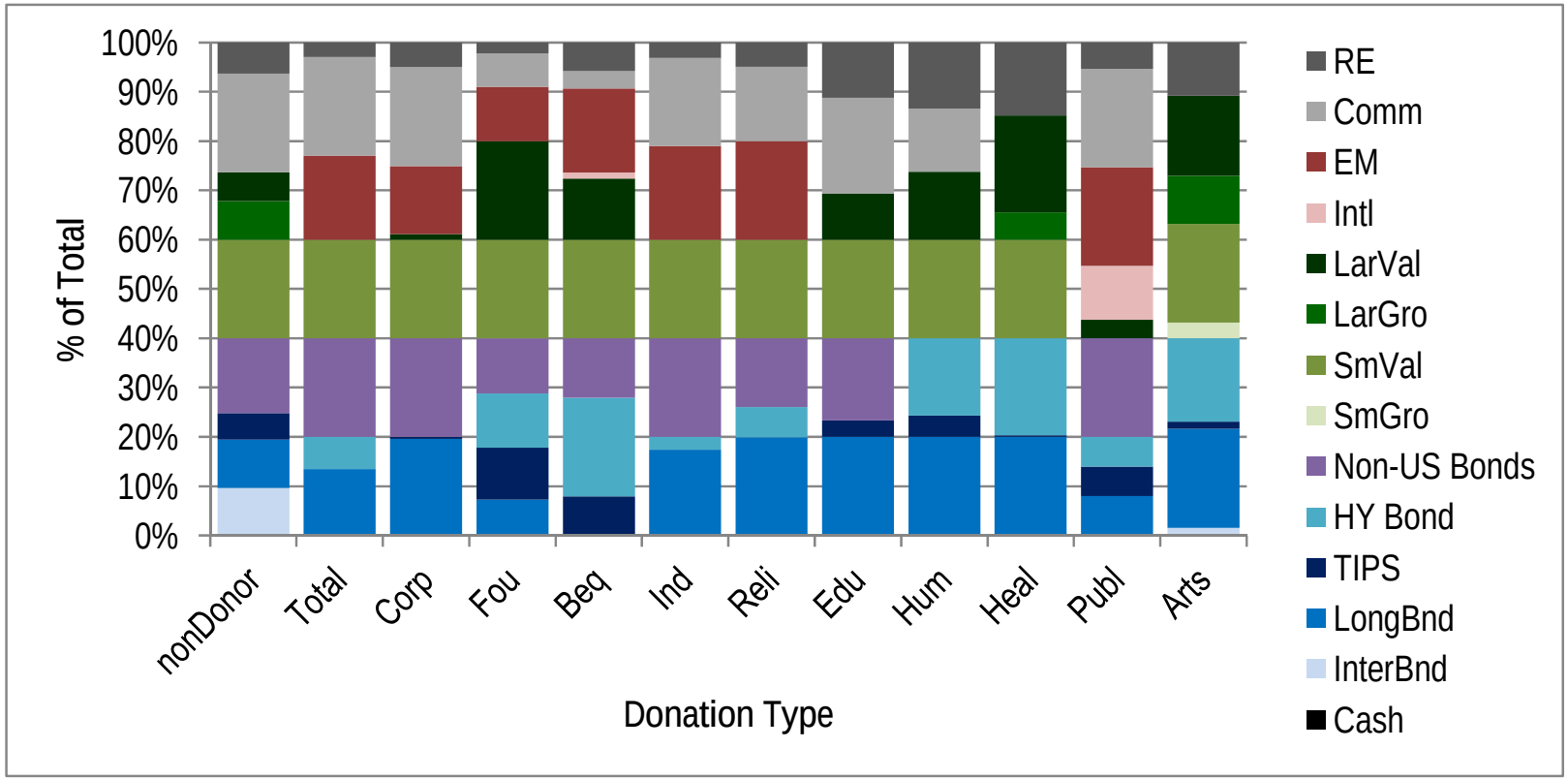
An Alternative Way to Consider Total Wealth: Charitable Endowments

Charitable Assets

- The wealth of a charity goes beyond it's financial (e.g., endowment) and nonfinancial (e.g., buildings) assets
- These other "assets," that have unique risks (often referred to as background risks)
- One example of a background risk is donation risk, i.e., the relationship between changes in donor behavior and market returns
    - individuals make ~80% of all charitable donations
    - religious charities are the largest recipient, ~ 33% of total

Optimal Portfolios Considering Donation Risk with a 60% Equity Target



Source: "Donation Risk and Optimal Endowment Portfolio Allocations." Morningstar White Paper by David Blanchett

Conclusions

Research Conclusions

- Financial assets are often only a small part of investors' total wealth
- Outside wealth such as human capital, pension wealth, and housing wealth exhibit economically and statistically significant correlations with financial assets
- Accounting for the correlation between outside wealth and financial asset in an optimization routine, materially changes the optimal portfolio allocations, both in terms of asset class weights and optimal equity allocation
- Industry-specific human capital appears to have the largest effect on allocations
- This study has important implications of how we think about building optimal portfolios for investors

Research Implementation

- This study has important implications of how we think about building optimal portfolios for investors, and is most applicable for the glide paths we build in our custom target date solution
- Morningstar's comprehensive suite of retirement solutions is based on practical applications of our academic research
- To learn more, visit us at morningstar.com/targetdate

Disclosure

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