Lifetime Asset Allocation Solutions:

The "balance sheet" based asset allocation approach

Peng Chen, Ph.D., CFA[®] President, Morningstar Investment Management

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a Morningstar company

Lifetime Financial Advice

Human Capital, Asset Allocation, and Insurance

Roger G. Ibbotson, Moshe A. Milevsky, Peng Chen, CFA and Kevin X. Zhu



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FINANCIAL "Cheerleaders in Lab Coats" May 1, 2008

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Agenda

- About Ibbotson and Morningstar Investment Management
- Lifetime Asset Allocation Solutions
 - Individual Investor's balance sheet
 - Managing Longevity Risk: Asset Allocation with Annuities
 - Implementation: A New Efficient Frontier Optimization for Retirement Income

Conclusion



Morningstar Investment Management

\$129.5B

Trusted Provider

- \$107.2 billion assets under advisement for investment consulting
- \$19.6 billion assets under management for managed accounts
- \$2.7 billion assets under management in managed portfolios

33+ yrs

Serving Clients**

with Annuities***

Client-Focused Solutions

- Access to Morningstar's global resources in 26 countries
- ▶ 90+ investment professionals
- Selected by 55 of the Fortune 500 to provide investment services

2 patents Human Capital and Asset Allocation

World-Class Reputation

- Frequently quoted in *The New York Times, The Wall Street Journal, Forbes, Fortune, BusinessWeek, etc.*
- ▶ More than 75 research papers written or co-authored
- 6 Graham and Dodd Awards awarded by the CFA Institute

*Data as of 12/31/2010 and includes retirement management and investment consulting clients for Morningstar Associates and Ibbotson Associates.

** Ibbotson Associates Inc. was established in 1977. Morningstar Associates was established in 1999 and Morningstar Investment Services, Inc. was established in 2001.

***Patent issued to Ibbotson Associates for Asset Allocation with Annuities in 2006. Patent issued to Ibbotson Associates for Human Capital in 2007.

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Delivering Investment Management

Retirement Solutions

Offers a diverse suite of investment products and retirement services

Products and Services

- Investment advisory services
- Custom target-maturity solutions
- Plan sponsor fiduciary services
- Professional asset management

Who we serve:

- 23 Plan Providers
- 147 K Plan Sponsors
- > 21.5 M Plan Participants (with access to our services)

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Develops actively managed mutual fund, stock, and ETF portfolios

Products and Services

- Tactical portfolios
- Active/passive portfolios
- Alternative portfolios
- Client and advisor technology and communication solutions

Who we serve:

2,000 Financial Advisors



Builds and manages innovative and customized investment solutions

Products and Services

- Asset allocation services
- Fund of funds consulting
- Subadvisory investment management
- Reporting and oversight
- Manager research

Who we serve:

Institutions

Data provided includes retirement management, portfolio management and investment consulting clients for Morningstar Associates, Ibbotson Associates and Morningstar Investment Services.

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The Human Capital Concept Looking Beyond the Traditional Concept of Wealth

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Traditional Asset Allocation Framework in Accumulation



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Human Capital

Human Capital



- Human capital is the actuarial PV of future labor income
- Directly affects one's capacity to take on risk with one's financial capital
- Human capital is used to fund:
 - Current expenses
 - Retirement savings
 - Direct contributions to portfolio
 - Defined contribution (match)
 - Defined benefit
 - Social Security



Human Capital



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Characteristics of Human Capital

- ► Contingent upon the investor's life
- Younger investors have more human capital than older
- ► Often investor's largest asset
- Not-tradable and illiquid
- Value and risk characteristics depend on age, income, education, health, etc.



Typical Life Cycle of Human Capital and Financial Capital



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Are you a stock or a bond?

Comprehensive Asset Allocation with Human Capital: Is Your Client a Bond or a Stock? By: Moshe A. Milevsky¹, Ph.D.

The title doesn't have a typo. I'm not asking about whether your client owns stocks and bonds, or whether they work in the stock or bond market. Rather, I'm wondering whether your client's job, career and employment income - also known broadly by the term human capital -exhibit the financial characteristics of a stock portfolio or a bond portfolio. Because, if they are stocks, you should be encouraging them to lighten-up on the equity risk, and to hold more bonds in their financial portfolio, but if they are more like bonds, then you should be selling them more stock-like investments.

Let me explain. But first some background. According to Statistics Canada the average Canadian family unit whose head of household is 30 years old, has a median net worth of approximately \$47,000. In other words, 50% of Canadian families in this category have a net worth greater than \$47,000 and 50% have a net worth that is less than this number. As you might expect, the net worth figure is technically defined equal to the family's total assets minus the family's consolidated debts and is expressed in year 2000 dollars. In the same study it was noted that if the head of household was 40 years old, the median net worth of the family unit was \$96,000 and for 50 year-olds the relevant figure was \$165,000. There should be no surprise about the impact of age on median wealth.

However, while I certainly do not quibble with Statistics Canada's methodology in this and similar studies, I truly think that a traditional account's assets minus liabilities view of the human balance sheet greatly under-estimates the true economic net worth of the company I like to call YOU Inc.

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or a Bond?

To build better portfolios, advisors need to measure a client's human capital. by Peng Chen

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Individual Balance Sheet

Assets	Liabilities
Financial Capital Human Capital PV of Earnings for Pre-Retirement Expenses PV of Earnings directed toward Savings PV of future Social Security and Pensions	Future Expenses PV of Pre-Retirement Expenses PV of Post-Retirement Expenses PV of Bequest
Surplus (Deficit)	

PV=Present Value

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Modern Portfolio Theory: Markowitz's MVO and Sharpe's CAPM



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Managing Mortality Risk Asset Allocation & Life Insurance

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Thought Leadership in Traditional / Insurance Hybrids





2007 Graham and Dodd Scroll Award

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Asset Allocation, Life Insurance, and Human Capital



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Managing Longevity Risk Asset Allocation & Annuities

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Typical Life Cycle of Human Capital and Financial Capital



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Risk (Fat-Tail) in Stock Market Returns

Histogram of S&P 500 Monthly Returns – January 1926 to Dec 2010



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Longevity (Fat-Tails) Risk in Mortality Rate



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Retirees Should Plan for a Long Retirement

Probability of a 65-year-old living to various ages



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New Efficient Frontier for Retirement Income

Traditional Mean-Variance Efficient Frontier

- Market Risk
- Longevity Risk
- Inflation Risk
- Inadequate Savings

New Income Frontier

- Average Sustainable Income vs. Shortfall Income for a given horizon
- ► Shortfall Income → shortage of income against a target in the worst market scenario (5th percentile)

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Addresses longevity risk in retirement

Average Income Level and Shortfall Risk 20 Year Horizon



Real Median Income – annual income that can be sustained at the 50th percentile over the target horizon.

Shortfall Income Risk – the shortage of income compared to a target income at the 5th percentile over the target horizon.

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Average Income Level and Shortfall Risk **30 Year Horizon**



Real Median Income – annual income that can be sustained at the 50th percentile over the target horizon.

Shortfall Income Risk – the shortage of income compared to a target income at the 5th percentile over the target horizon.

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Needs Title



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Thought Leadership in Traditional / Insurance Hybrids



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Real Median Sustainable Income vs. Real Shortfall Income **20 Year Horizon**



Real Median Income – annual income that can be sustained at the 50th percentile over the target horizon.

Shortfall Income Risk – the shortage of income compared to a target income at the 5th percentile over the target horizon.

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Real Median Sustainable Income vs. Real Shortfall Income **30 Year Horizon**



Real Median Income – annual income that can be sustained at the 50th percentile over the target horizon.

Shortfall Income Risk – the shortage of income compared to a target income at the 5th percentile over the target horizon.

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Annuity is an Insurance!

For the average scenario, insurance will not payoff.

In other words, it will have negative "returns".

For "tail" scenarios, it will payoff, the longer the tail, the higher the payoff.

- Longevity
- Market return





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Immediate Annuity Objective Function Implementation Model



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Asset Allocation with Payout Annuity and VA + GMLB: Key Factors

Factor	Proportion to Implement with PA or VA+GMWB	Reason
Large Bequest*	Lower	Preference to leave more
High Income Sustainability*	Higher	Preference for personal consumption
High Subjective Survival Probability*	Higher	Perceived longevity risk / suitability
High Fees	Lower	Fees reduce returns
Large Wealth*	Varies	Ratio of wealth to income need
High Income*	Varies	Ratio of wealth to income need

* Factors that are typically solicited using a retirement income questionnaire.

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More Risk Equals More Value (More Cost) with the Guarantee



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Investors Should Invest More Aggressively With Guarantees



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Lifetime Income Questionnaire





Asset Allocation with Insurance Products





Features for Various Retirement Income Options

	Inflation	Longevity	Liquidity	Estate	Fees
Immediate Fixed Annuities	Low	High	Low	Low	Low
VA+GMWB	Median	Median	Median	Median	High
Traditional Assets	High	Low	High	High	Median

Source: Harlow and Milevsky, 2007

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The "Vanguard" Test





Vanguard Applies for a GLWB Rider

February 17, 2009

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Summary

Lifetime asset allocation developed based on individual investors' balance sheet

- Younger investors needs to
 - Protect human capital
 - Grow financial assets (and human capital)
 - Less concern about market risks
- Older investors
 - Protect financial assets against market risk, especially tail risk
 - Ensure money last lifetime, capture "mortality yield".
 - New retirement income efficient frontier is more effective for tradeoffs on retirement income than traditional mean-variance efficient frontier



Appendix

Vanguard Applies for a GLWB Rider

By Retirement Income Reporter

February 17, 2009

Vanguard, the low-cost direct marketer of mutual funds and other financial products and services, has filed an application with the SEC for a flexible variable annuity contract with a guaranteed lifetime withdrawal benefit.

An AEGON subsidiary, the Monumental Life Insurance Company, will provide the insurance wrapper. Vanguard does not own its own insurance company. The new contract resembles Vanguard¹s existing no-load, no-surrender fee variable annuity, but with a lifetime income option.

The precise cost of the rider, which can apply to one owner or joint owners, and the payout rates at various age bands were left blank in the application, although Vanguard provided an example that set the rider cost at one percent of the income base. The minimum initial payment is \$5,000 and a \$25 annual fee is assessed when the account value drops below \$25,000.

Owners who choose the GLWB have one investment option, a balanced fund with a 0.24% expense ratio. The fund invests 60% to 70% of its assets in mid-cap and large-cap stocks, especially dividend-paying value stocks, and the rest in government and corporate bonds.

If the rider fee remains at the 1% preliminary estimate, the total annual expense ratio of the contract, including the GLWB rider, would be 1.54% to 1.66%, including a death benefit option (priced at 0.20%, 0.25% or 0.32%) and a 0.10% administrative charge.

The rider includes a step-up of the income base to the account value on every contract anniversary, if the account value is higher. Owners can discontinue the rider if their situation changes, and reinstate it if desired. There are no penalties for surrenders or distributions, other than that assessed by the IRS on withdrawals before age 59 1/2.

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