

Wealth Management and the Real Options in Your Life

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Government Finance (1940 -1970)

Corporate Finance (1970 - 1990)

Personal Finance (1990 -)

Main Point:

- { Within the financial services arena, individual wealth & risk management issues are taking centre stage.
- { Your financial futures is uncertain and random, but we can quantify the odds and make decisions that minimize the chance of regret...

Inspiration...

- { Modern *financial engineering* concepts are being applied to the individual and their personal balance sheet.
- { Quantitative *risk management* processes and related software systems are being used to help individual investors.
- { The *real option pricing* paradigm can be applied to decisions you face in your personal financial life...

The Balance Sheet: Me Inc.

Traditional Approach

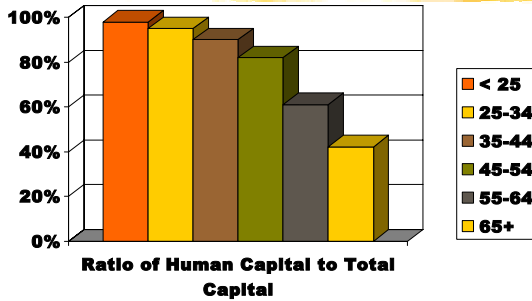
Assets <ul style="list-style-type: none"> • Bank Accounts • Housing • Stocks & Bonds • Car & Vehicles • Small Business Equity • PV of Pension 	Debt + Liabilities <ul style="list-style-type: none"> • Mortgages • Consumer Loans • Credit Cards • Student Loans
	Equity <ul style="list-style-type: none"> • Net Worth of Me Inc.

The Balance Sheet: Me Inc.

Modern Approach

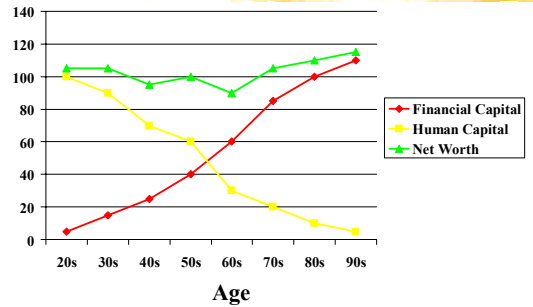
Assets <ul style="list-style-type: none"> • Bank Accounts • Housing • Stocks & Bonds • Car & Vehicles • Small Business Equity • PV of Pension 	Debt + Liabilities <ul style="list-style-type: none"> • Mortgages • Consumer Loans • Credit Cards • Student Loans
+ HUMAN CAPITAL	Equity <ul style="list-style-type: none"> • Net Worth of Me Inc.

Ratio Of Human Capital to Total Capital: Various Canadian Age Groups



Source: Statistics Canada (1999) 13-595-XIE and Author Calculations

Expanded View of Net Worth



Human Capital Value: An Example:

- { The median Canadian economic family unit, age 30, earns \$40,500 after-tax, with a net-worth of \$47,500.
- { Assume the family unit works for 30 more years, to age 60, and then retires.
- { Human Capital valuation discounts after-tax salary at (1) risk-adjusted, (2) after-tax, (3) real rate of return.

What is the Value of Human Capital?

Age 30, Salary of \$40,500 after-tax for 30 years

Discount Rate	\$ P.V. of H.C.	% of T.C.
3.5%	744,900	94%
5.0%	622,600	93%
7.5%	478,300	91%

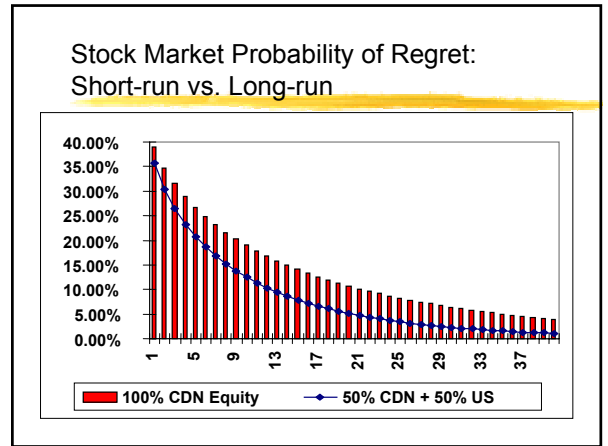
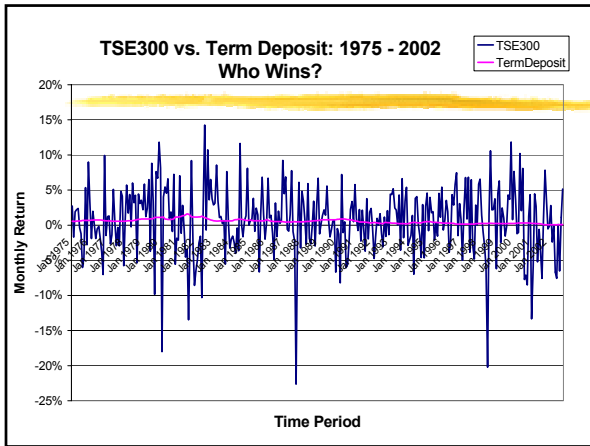
Source: Milevsky calculations.

Human Capital: Total Asset Allocation

- { Is it equity or is it debt?
- { Entrepreneur vs. government employee.
- { Human capital as a shadow asset class.
- { Standard diversification rules apply.
- { Insurance used to protect H.C. and F.C.
- { Study co-variation with financial portfolio
- { Do not invest in what you know!

Total Asset Allocation: The Main Questions

- { Is my future income and salary flow **correlated** with my financial portfolio?
- { If my financial capital declines, will it adversely **impact** my human capital?
- { Do my human capital and financial capital share the same **risk factors**?
- { If the answer to any of these questions is yes, then you are not properly **diversified**.



Real vs. Financial Options

- { A **financial option** is the **right**, but not the obligation to **buy/sell** an asset at a fixed **price**, during a certain **period**.
- { Incentive stock options, exchange traded puts & calls, and car leases are examples of financial options.
- { Volatility and time induce option value.
- { **Real options** are the Human Capital equivalent of **financial options**

Example of a Real Option

- { You own a gold mine in South America with 10,000 estimated ounces of reserves.
- { The cash extraction costs are \$400 USD per ounce, while the market price is \$270.
- { The Net Present Value (NPV) of the gold mine, using standard methods, is zero.
- { Is the mine (project) worth anything?
- { **Yes**: It contains a Real Option

University Education: The Real Option to Expand

- { Undergraduate students must choose a major early in their (academic) life.
- { The wrong major eliminates, or greatly reduces, certain career opportunities.
- { There is an **option to expand** that comes from choosing a flexible major, even at the expense of lost wages and time.

Marriage: The Option to Delay

- { Projects are mutually exclusive.
- { Costs incurred, when trying to reverse or abandon, are high.
- { What are the probabilities of locating a better project?
- { Evidence that delay is correlated with the availability of competition.

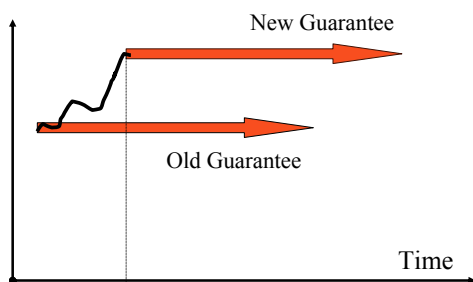
Housing and Mortgages

- { The transaction costs associated with selling (or buying) a house can be substantial.
- { It provides an incentive to delay purchases.
- { Rent vs. Buy comparison should account for all the **real options** in the two choices.
- { Floating rate open mortgages contain the embedded **real option** to lock-in at any time.
- { Home improvement is a **real option**.

Segregated Funds

- { Most contain a 100% maturity guarantee.
- { This put option has some value.
- { Is it worth the extra cost?
- { Do you need the protection?
- { You have a **real option** to re-establish the basis of the guarantee.

When is the optimal time to lapse?



What are the chances of dying during the next ten years?

Current Age	Female	Male
40	1%	3%
50	3%	6%
60	9%	16%
70	22%	35%
80	50%	66%

Source: StatsCan 1996

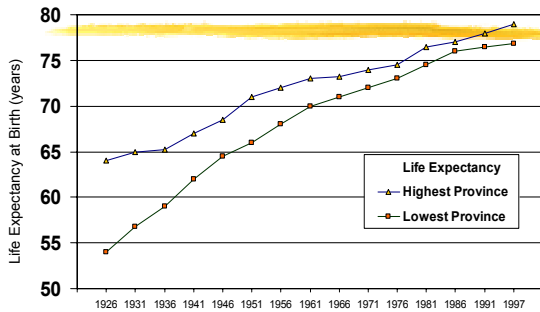
Real Options in Life Insurance

- { Guaranteed insurability is a **real option**.
- { Should you purchase a cash value policy, or should you buy convertible-term, and retain the **real option** to convert later?
- { Buy-term and invest-the-difference analysis misses the **real option** value.
- { Tax policy might change in the future.

Pensions and RRSP Savings

- { Savings: qualified or outside the shelter?
- { Should you contribute now or later?
- { The high return from contributions may not exceed the lost option value to delay.
- { Instead of collapsing an RRSP, borrow at higher rate, since you lose the option.
- { Options in converting from DB to DC.

Range of Life Expectancy at Birth for Both Sexes in the Canadian Provinces: 1921-1997



Data Sources: Institute for Clinical Evaluative Sciences; Atlas Reports, The Health of Ontarians
Organization for Economic Cooperation and Development Health Data 1998

The Conditional Probability of Survival at Age 65

To Age:	Single Female	Single Male	At Least Member of a Couple
70	93.8%	92.0%	99.5%
75	84.4%	79.9%	96.9%
80	70.9%	62.7%	89.1%
85	52.8%	41.0%	72.2%
90	31.6%	19.6%	45.0%
95	13.4%	5.8%	18.4%

Source: Society of Actuaries RP-2000 Table

Option to Work and Retire

- { Once retired it is difficult to return to the labor force and start working again.
- { Early retirement exercises a **real option**.
- { It might be best to delay retirement until you are absolutely sure the **option to work** has no future utility.


Option to Start a Pension

- { The purchase of a lifetime (pension) annuity is non-reversible, but can always be delayed.
- { The benefit is protection against longevity risk, the cost is the loss of liquidity.
- { When is the optimal time to exercise this real option?

Annuitization

- { At retirement, most people must decide how much of their liquid wealth should be voluntarily annuitized.
- { Few people choose to buy life annuities, despite strong reasons for annuitization.
- { The decision is irreversible, can always be delayed and therefore contains an option.

Real Options in Your Life: A Litmus Test

- { Is it difficult or impossible to reverse the decision you are about to make?
- { Will time tell whether or not you made the right decision?
- { Is your downside-risk limited if you wait?
- { Can your preferences change?
- {  The Real Option Has Value
- { Wait!

Conclusion

- { You are the CEO and CFO of Me Inc.
- { There are many stakeholders in Me Inc. and although your board of directors can't really fire you, they can certainly diminish your power and control.
- { Manage the financial affairs and risks of Me Inc. in the same way as a large business conglomerate.
- { Hedge, Insure and Diversify your Total Capital

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