

An Overview of the Real Options in Your Life

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Government Finance (1940 -1970)



Corporate Finance (1970 - 1990)



Personal Finance (1990 -)

Objective:

- Help you identify and value the 'Real Options' in your client's portfolio
- Real Options arise when:
 - they face a financial decision whose consequences are difficult to reverse.
 - they can defer making the decision.
 - There is an element of volatility
 - hindsight is 20/20.

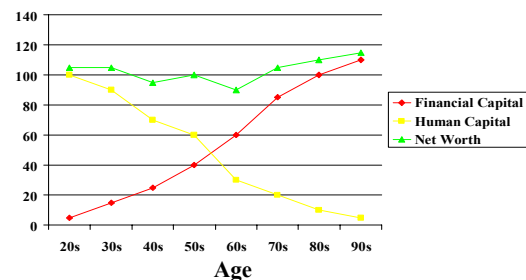
Outline of Presentation

- Human vs. Financial Capital
- Introduction to Real Options in PF&I
- An Optional Walk Through the Life Cycle
 - The Trivial, The Obvious and The Complex
- Case Study: Option To Take A Pension
- Summary and Conclusion

Human vs. Financial Capital

- Your client has an implicit investment in both human and financial capital.
- Human capital is the embodiment of all future wages, salary, and pensions.
- During the life-cycle, human capital (HC) is converted to financial capital (FC).
- For most people in their 30s, 40s and even 50s, human capital is more valuable than financial capital.

Expanded View of Clients Wealth



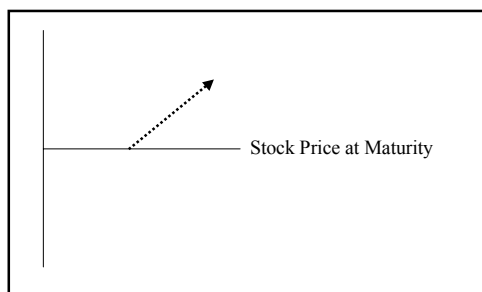
The Client's Human Capital

- Is it equity or is it debt?
- Entrepreneur vs. government employee.
- Human capital is a 'shadow' asset class.
- Standard diversification rules apply.
- Life, health, disability and employment insurance, is used to protect human capital.

Financial Options

- A financial option contains the **right**, but not the obligation to **buy/sell** an asset at a fixed **price**, for a certain **period**.
- Think of executive stock options, exchange traded put and call options, or a car lease.
- Most financial options can be traded in a secondary market, and have explicit value.
- **Volatility** adds value.

Payoff from a Long Call Position



Real Options

- "...Every project competes with itself delayed in time..."
- Flexibility has strategic value.
- Simple discounting and time-value-of-money rules will ignore the option.

Education and Option to Expand

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

Marriage: The Option to Delay

- These 'investments' are mutually exclusive.
- The costs incurred, when trying to reverse or abandon the initial investments, are high.
- What are the probabilities of locating a better 'investment'?
- Empirical 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 option to 'lock in' at any time.

Segregated Funds

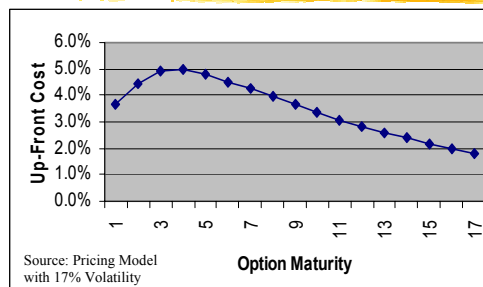
- Most contain a 100% maturity guarantee.
- This put option has 'some' value.
- Is it worth the extra cost?
- Do you need the protection?
- You have a real option to re-establish the basis of the guarantee, even without a reset.

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

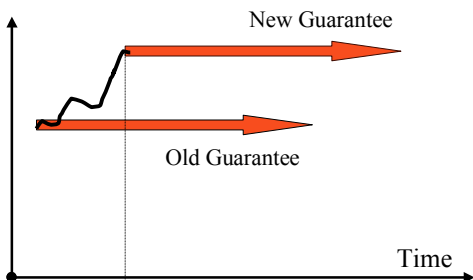
Current Age	Female	Male
40	1%	3%
50	3%	6%
60	9%	16%
70	22%	35%
80	50%	66%

Source: StastCan 1996

Protection: At What Price? At-the-money put option



When is optimal to reset?



Real Option in Life Insurance

- Guaranteed insurability is an option.
- Term versus whole-life policy.
- Should you convert to a cash value (fixed premium) policy, or should you retain the option to convert later?
- Income taxes may decline in the future, and tastes for bequest might change as well.

Long-Term Care Insurance

- The earlier in life you buy the policy, the cheaper the periodic premiums.
- This is an argument to buy at 40 vs. 60.
- But:
 - Better coverage might appear in the future.
 - Today's policy might rise in price.
 - The healthcare system might improve.

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.

Option to Work and Retire

- Once retired it is difficult to return to the labor force and continue working.
- Early retirement is exercising an option.
- It might be best to delay retirement until you are absolutely sure the option to work has no value.

Option to Start a Pension

- The lifetime 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 option?
- Detailed analysis follows (time permitting)

The Final Abandonment Option

- SUICIDE:
- A rational look at an irrational act.
- The net present value of future lifetime utility must be negative, by at least the option value.

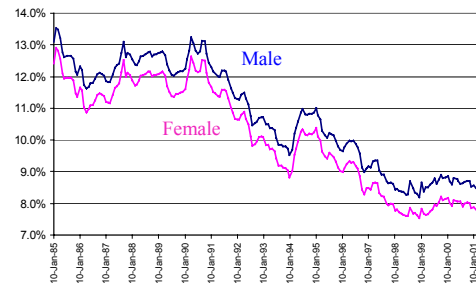
Case Study: Annuitization

- 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.

Types of Immediate Life Annuity:

- ! Straight Life, Joint-life, or Last survivor
- ! Substandard or impaired health
- ! Indexed or Variable
- ! Pros:
 - ! guaranteed income for life
 - ! longevity insurance, protection
- ! Cons:
 - ! non-reversible purchase
 - ! nothing for the estate

Evolution of the Annuity Yield Curve
Age 65 with 10yr pc: 1985 - 2001

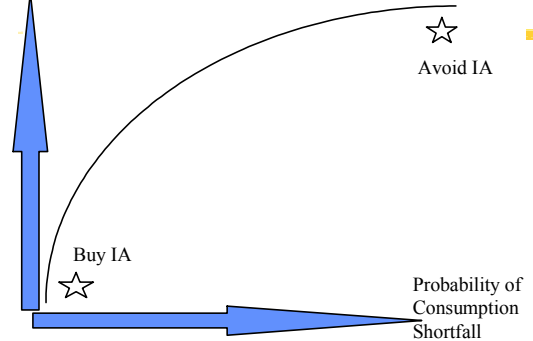


You Are 65 Years Old: How Long Will You Live?

Live to Age:	Female:	Male:
70	94.0%	89.2%
75	85.5%	75.1%
80	73.4%	57.6%
85	56.6%	38.2%
90	35.9%	20.1%
95	18.6%	7.5%

Source: Statistics Canada 1995/1996 Health Tables

Bequest Motives



Life Annuity Quotes: Male

Per \$100,000 Purchase (Zero Guarantee)

InsCo	60	65	70	75	80
A.	665	741	849	1,002	1,222
B.	650	706	778	890	1,050
C.	679	772	891	1,042	
D.	675	752	864	1,026	
E.	667	738	834	983	1,194
F.	646	716	816	958	1,160

Source: CANNEX, April 4, 2001

Numerical Example: How To Beat a Life Annuity

Age	Death Probability	Required Return
55	2.26/1000	6.2%
65	5.76/1000	6.6%
75	16.34/1000	7.8%
85	54.05/1000	12.1%
90	95.84/1000	17.2%

Assumptions: R=6%, load=0%, IAM1996 Table

Conclusion: Life Annuity

- The decision is irreversible.
- Do not buy it too early, since you are losing the option to buy it later.
- Do-it-yourself and-then-switch gives the best odds of success.
- Later in life (80+), the return from life annuities are very high.

Longevity protection vehicles I would like to see (more of) in Canada

- A Pure Deferred Annuity
- Variable Immediate Annuities
- Tax Sheltered Saving Annuities
- The Option to Annuitize
- Longevity plus LTC Insurance
- Impaired and Cashable Annuities

Real Options in PF&I: Lessons Beyond the Numbers

- Look around you: options are everywhere.
- A precise value is impossible to obtain.
- Don't give for free: rationality is increasing.
- Ask yourself: What does it cost to reverse?
- The Knowledge is the Option:
 - I will learn more...by tomorrow.

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