Human Capital, Asset Allocation and Life Insurance

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Human capital and Investing

▶ Human capital is the cumulative value of our capacity to labor in exchange for money

▶ More simply put, human capital is the present value of one's future labor income

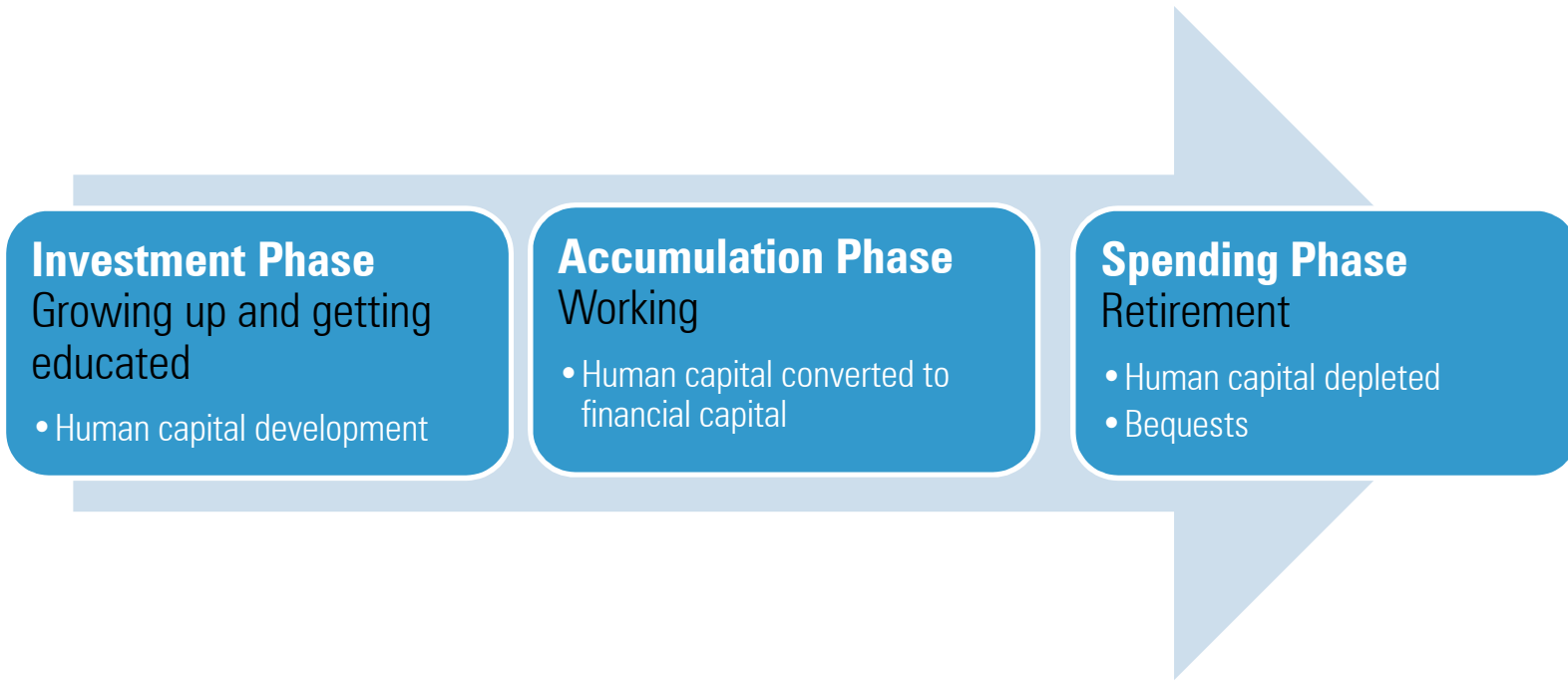▶ In general terms, investment means the use money with the goal of making more money

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Human capital vs. Investing

► Human capital and investing are similar in that:

  ► The purpose is to make money

  ► Can increase or decrease in value as a result of the environment or active decision making

  ► Can be hedged

► Human capital is unique in that:

  ► It is highly illiquid

  ► Has unique risks mortality, disability and professional competency risks

  ► Is tied to a lifecycle

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Financial stages in life

Investment Phase
Growing up and getting educated

- Human capital development

Accumulation Phase
Working

- Human capital converted to financial capital

Spending Phase
Retirement

- Human capital depleted
- Bequests

Human and financial capital during the accumulation phase

Chart 1: Expected Financial Capital and Human Capital over Life Cycle.

Chart 1: Financial Capital and Human Capital Over The Life Cycle
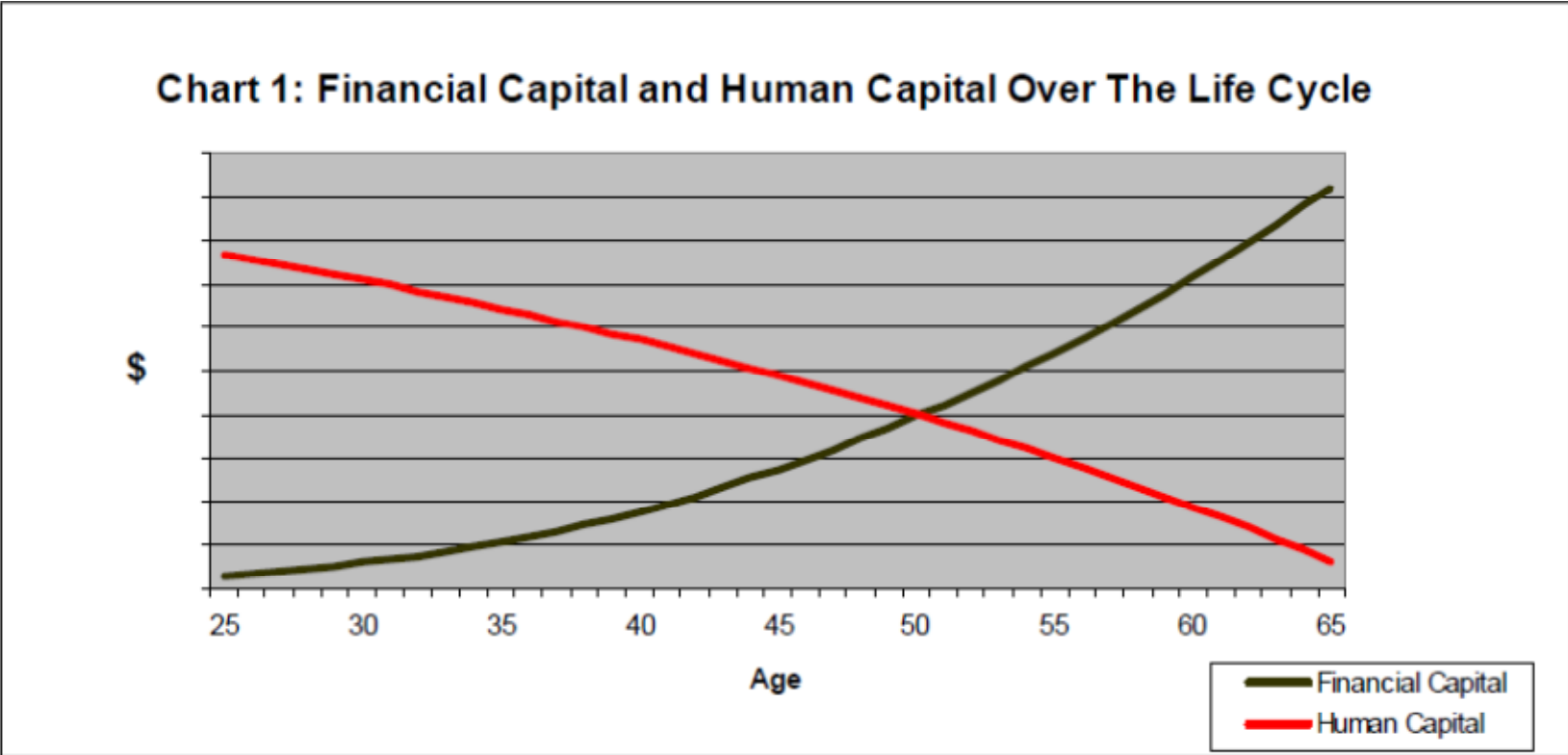
Not a new concept

▶ Key theoretical implications of other studies:

  ▶ Young investors will invest more in stocks

  ▶ Investors with safe labor income will invest more into stocks

  ▶ Investors with labor income highly correlated with stocks markets will invest less into risky assets

  ▶ The ability to adjust labor supply increases one's allocations toward stocks

Are you a stock or a bond?

► Traditional risk lifecycle and target date frameworks are inadequate and neglect the uniqueness of our human capital:

  ► Size of human capital

  ► Volatility of human capital

  ► Correlation of human capital with other assets

If human capital were an asset class

Characteristic	Human capital	Risky financial assets	Cash/Risk-free assets
Liquidity	Highly illiquid	Relatively liquid	Very Liquid
Hedge	Insurance	Derivatives and shorts	N/A
Volatility	Can be stock or bond-like (research shows that correlation ranges from -0.1 to 0.2)	Low/moderate for bonds and moderate/high for stocks	Low
Risks	Mortality risk, disability risk and professional competency risk	Market risk, security specific risk, liquidity risk etc.	Inflation risk

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Human capital risk management

"Our greatest asset gets up and walks out the door every night."

▶ Life insurance is a perfect hedge for human capital mortality risk

▶ There are two reasons to get life insurance: bequests and manage mortality risk

▶ Empirical research shows that underinsurance is prevalent likely due to questionable financial advice and the unpleasantness of thinking about one's death

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Anecdotal observations

► Human capital has some asset class-like characteristics in that its size, volatility, and its correlation with other assets matter

► Human capital also has some unique characteristics such as illiquidity, depletion over a lifecycle and unique risks

► Human capital and financial capital tend to have an inverse relationship – human capital which is highest is traded for financial capital in the accumulation phase

► Mortality risk can be hedged via life insurance and bequest preferences can impact insurance demand

► Asset allocation decisions and life insurance decisions should be made with human capital considerations in mind

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Case Study

A Framework for human capital, asset allocation and life insurance

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▶ Peng Chen, R.Ibbotson, M.Milevsky and K.Zhu, "Human Capital, Asset Allocation, and Life Insurance" (FAJ Volume 62, 2006)

$$\max_{(\theta_x,\alpha_x)} E\left[(1-D)(1-\overline{q}_x)U_{alive}\left(W_{x+1}+H_{x+1}\right)\right. \tag{1}$$
$$\left.+D\left(\overline{q}_x\right)U_{dead}\left(W_{x+1}+\theta_x\right)\right],$$

where

θ_x	=	amount of life insurance
α_x	=	allocation to the risky asset
D	=	relative strength of the utility of bequest, as explained in Appendix C
$\overline{q}_x$	=	subjective probabilities of death at the end of year $x + 1$ conditional on being alive at age x
$1-\overline{q}_x$	=	subjective probability of survival
W_{x+1}	=	wealth level at age $x + 1$, as explained in Appendix C
H_{x+t}	=	human capital

Framework for human capital, asset allocation and life insurance

Diagram 1: Human Capital, Asset Allocation, and Life Insurance
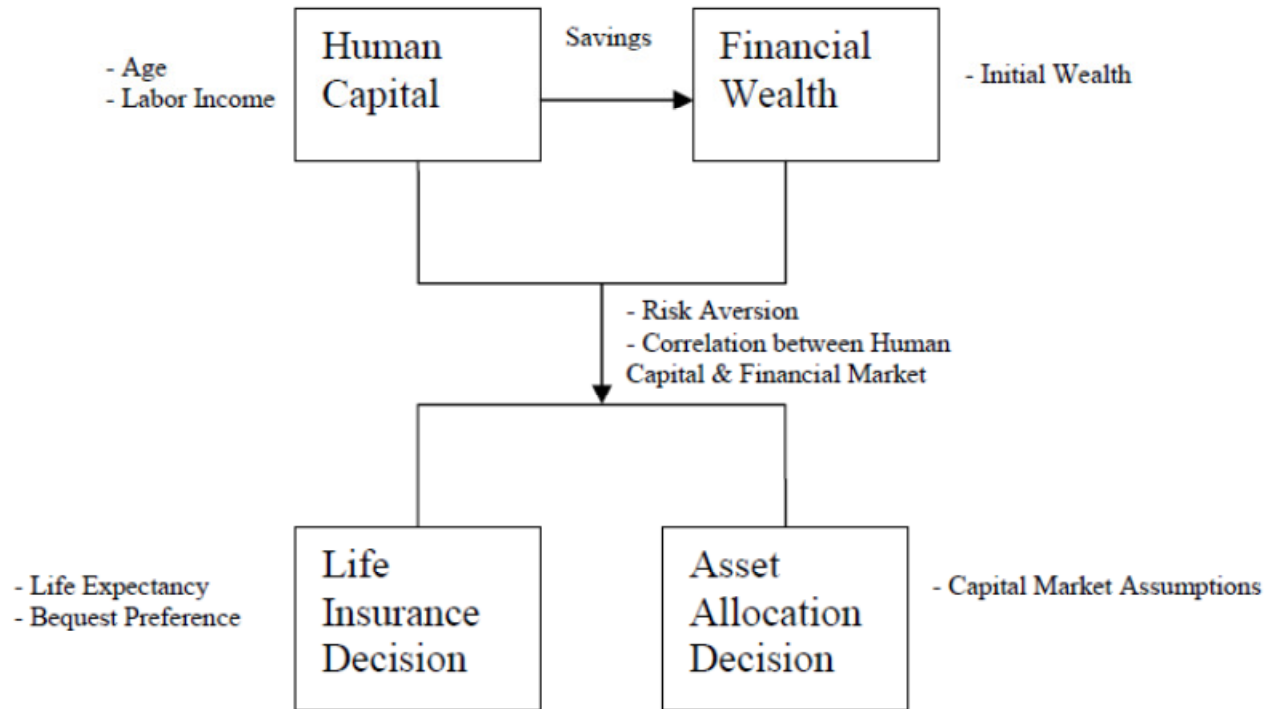
Case study assumptions

▶ $50,000 income expected to grow with inflation with 5% volatility

▶ Preference for consumption in live vs. dead state is 0.8 and 0.2 respectively

▶ His current wealth is $50,000 saves 10% of his income annually and will receive a $10K pension when he retires at 65

▶ Insurance in this case is considered to be annually renewable term insurance and he rebalances his portfolio annually

Table 1. Capital Market Return Assumptions

| Asset/Inflation	Compound Annual Return (geometric mean)	Risk (standard deviation)
Risk-free (bonds)	5%	—
Risky (stocks)	9	20%
Inflation	3	—

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How Does Human Capital influence Asset Allocation?

Chart 2: Human capital, Insurance Demand, and Financial Asset Allocation over the Life
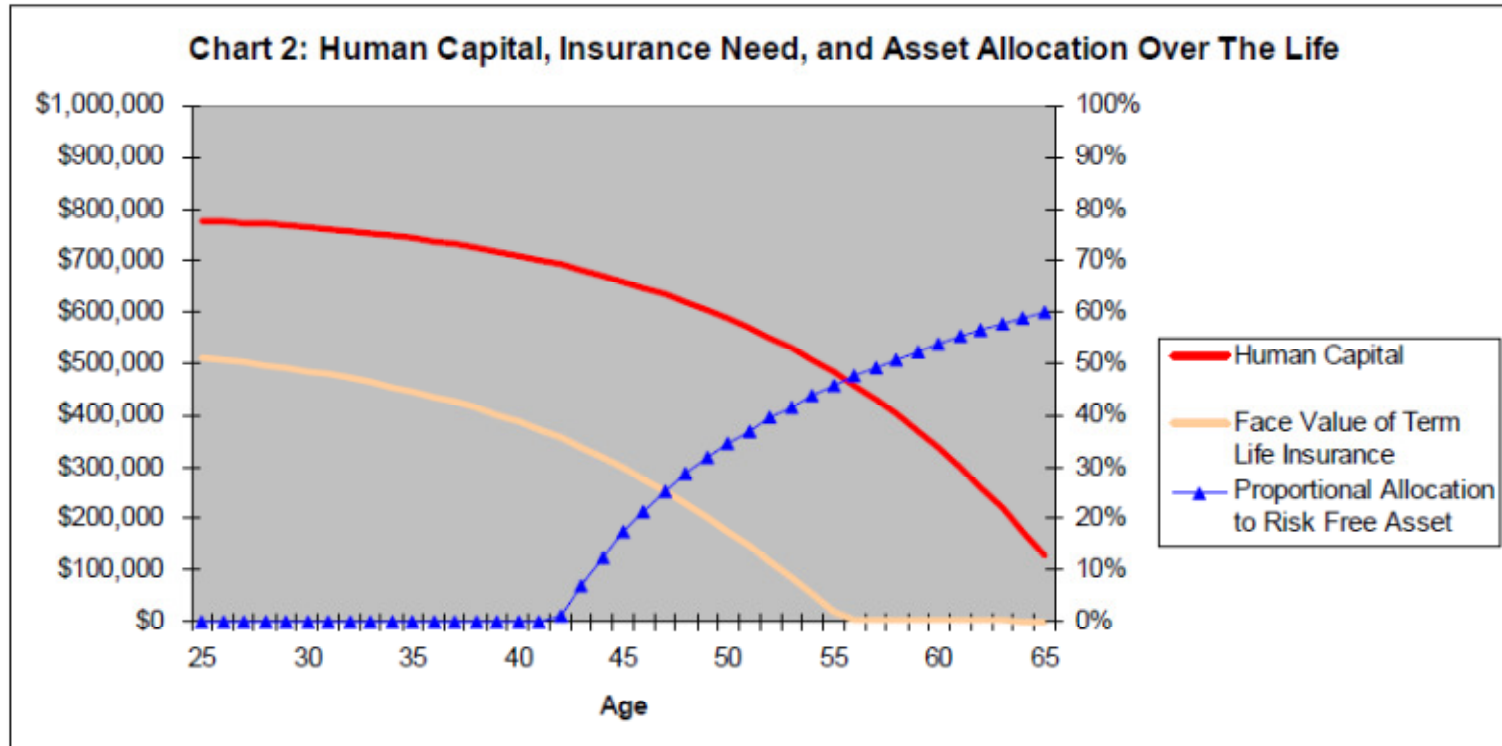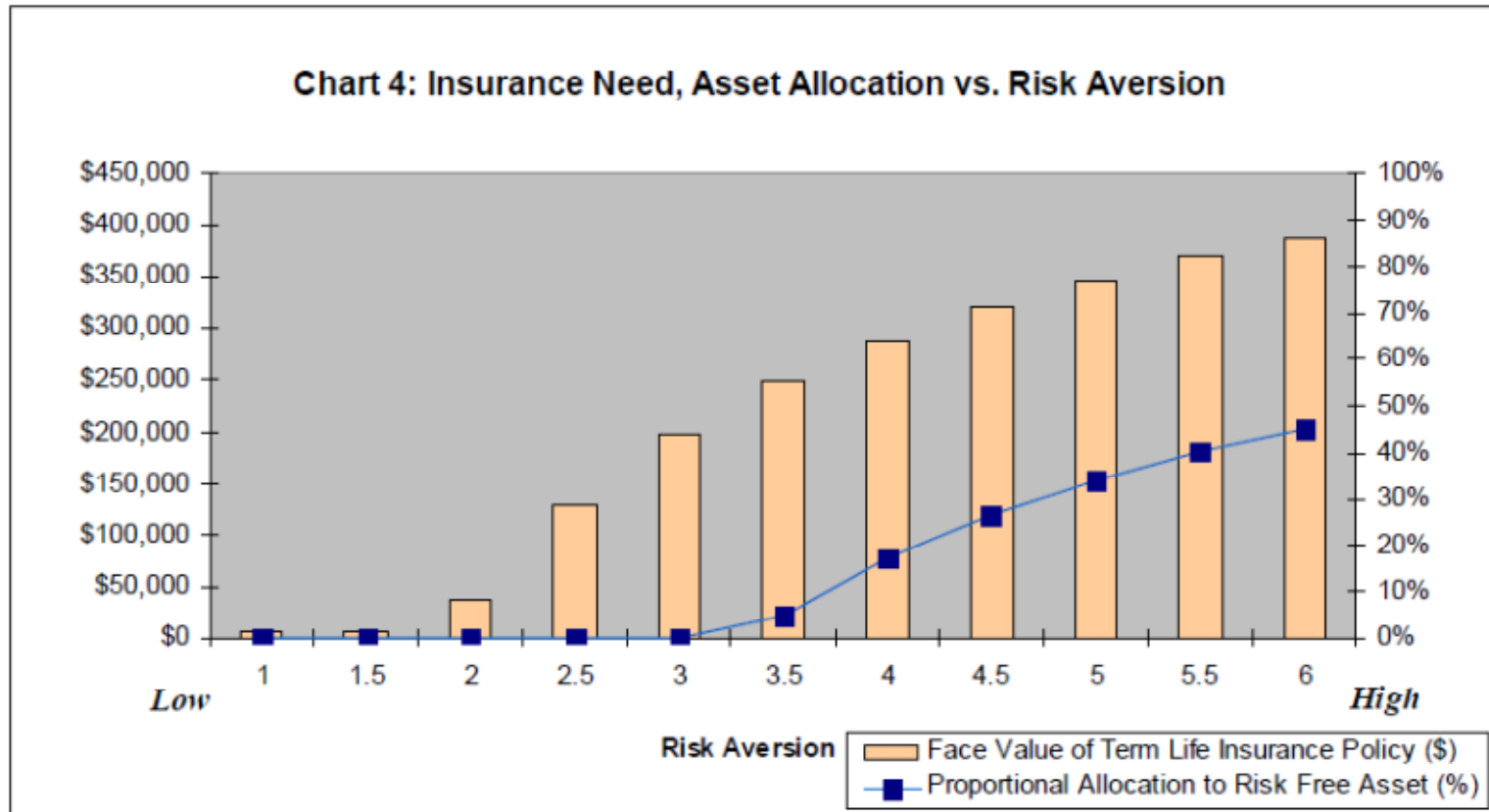
The effect of the bequest motive

Chart 3: Optimal Insurance Demand and Asset Allocation across Strength of Bequest
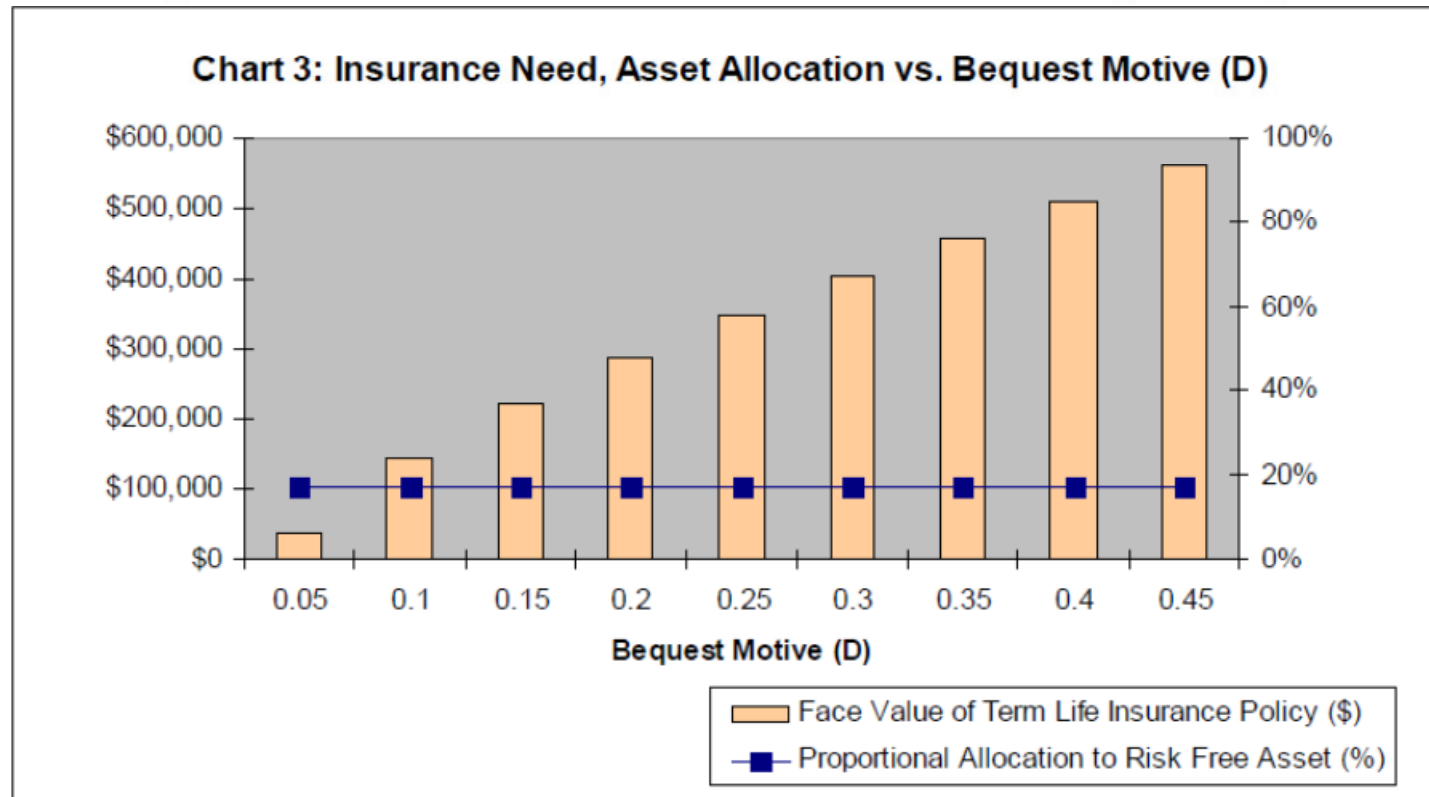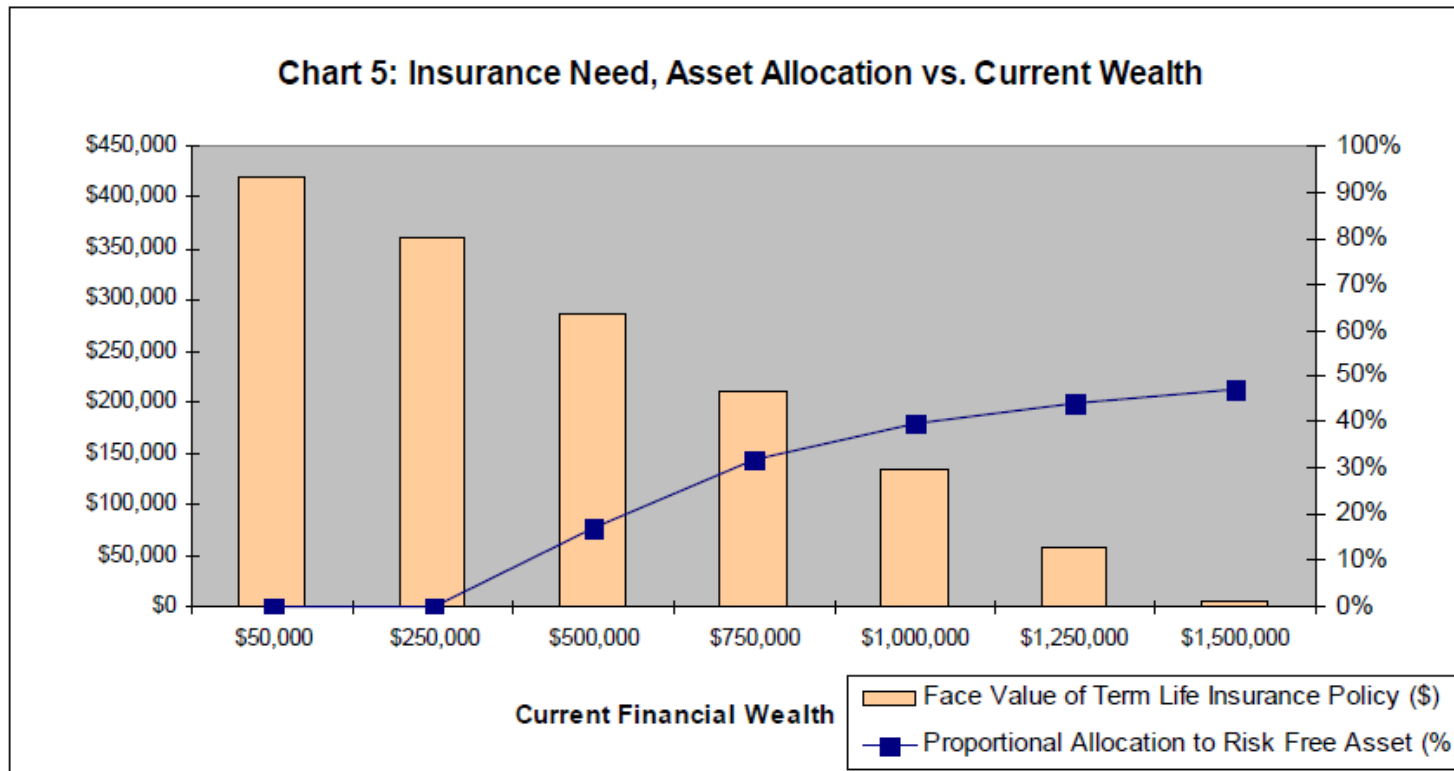
The effect of risk aversion

Chart 4: Optimal Insurance Demand and Asset Allocation at Different Risk Aversion Levels

The effect of financial wealth

Chart 5: Optimal Insurance Demand and Asset Allocation at Different Financial Wealth Levels

Chart 5: Insurance Need, Asset Allocation vs. Current Wealth

Correlation between wages and risky asset returns

Chart 6: Optimal Insurance Demand and Asset Allocation at Different Correlation Levels

Chart 6: Insurance Need, Asset Allocation vs. Correlation
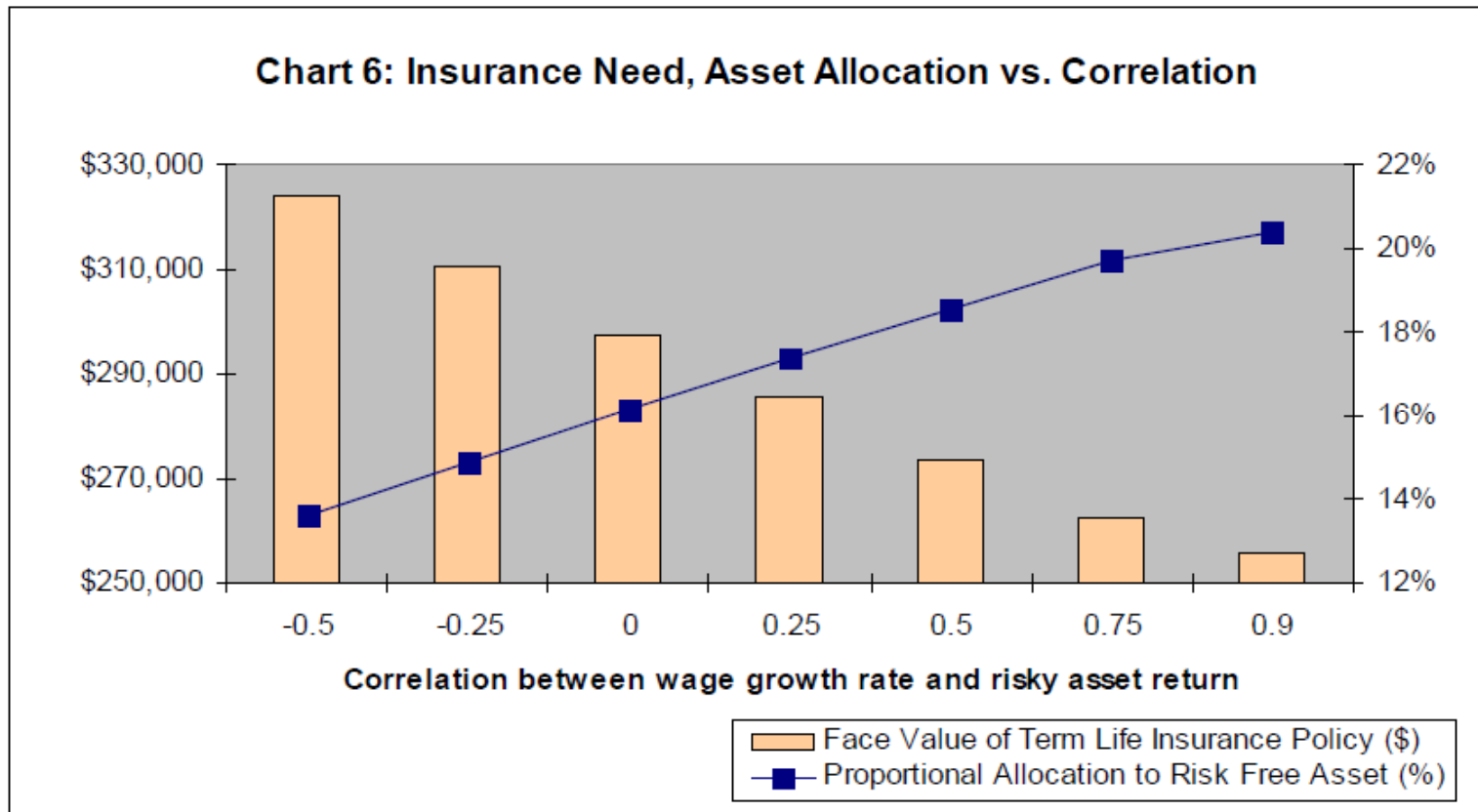
Summary of the case study

Variable	Insurance Face Value	Allocation to risk free assets
Higher bequest motive	Higher	Stays the same
Lower risk tolerance	Higher	Higher
Financial wealth	Lower	Higher
Correlation of wage growth and risky asset returns	Lower	Higher

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