Università di Trieste
DEAMS – Bruno de' Finetti

Chapter 11

THE ENTREPRENEUR'S PERSPECTIVE ON VALUE

Valuation: The Entrepreneur's Perspective

1. Underdiversification causes the entrepreneur's required rates of return to be higher than that of a diversified investor
2. Ownership claims of investors and entrepreneurs are not identical
3. The parties may have different beliefs about expected performance and risk

Opportunity Cost and Choosing Entrepreneurship

What drives the decision to become an entrepreneur?

- Opportunity cost of committed
  - human capital

    and
  - financial capital

The Entrepreneur as an Underdiversified Investor

- Cost of capital depends on the ability to diversify
  - diversified investors determine the risk-return trade-off for market assets
  - voluntary underdiversification does not justify a higher discount rate
- What makes entrepreneurial investment different?
  - new ventures are not market assets
  - entrepreneurs must bear nonmarket risk
- Deciding whether the return is worth the extra risk
  - adjust the required rate of return in light of the risk the entrepreneur bears

Attributes of Entrepreneurs: Data on Wealth, Savings, and Diversification

- Wealth
  - less diversified at higher levels of wealth and income
  - inheritance increases the probability of becoming (and remaining) an entrepreneur
- Savings/investment: Business owners
  - have higher savings rates
  - have higher wealth-to-income and savings-to-income ratios
- Diversification: Business owners
  - are less diversified; hold more wealth in business assets and non-residential real estate
  - become less-diversified over time

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

Entrepreneur with total wealth of $300,000 is considering a $100,000 investment in a venture with the following likely payoffs:

Scenario	Probability	Year 1 payoff	Return
Success	1/3	$200,000	100%
Likely	1/3	$125,000	25%
Failure	1/3	$53,000	−47%

Expected return = [(100% × 1/3) + (25% × 1/3) + (−47% × 1/3)] = 26%

Standard deviation of expected return:

$= [(100\% - 26\%)^2 \times 1/3 + (25\% - 26\%)^2 \times 1/3 + (-47\% - 26\%)^2 \times 1/3]^{0.5} = 60\%$

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

- Other assumptions
  - risk-free rate = 4.0%
  - Expected market return = 12%
  - standard deviation of market return = 15%
  - correlation between the venture's return and the market = 0.5
- We can now estimate the venture's beta

$$\beta_j = \frac{\rho_{r_j,r_M}\sigma_j}{\sigma_M} = \frac{0.5 \times 0.60}{0.15} = 2.0$$

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

- The CAPM return a well-diversified investor would require to invest in the venture:

$$r_j = r_F + \beta_j(r_M - r_F) = 4\% + 2.0(12\% - 4\%) = 20\%$$

- With 1/3 of total wealth committed to the venture, the entrepreneur faces more risk than a well-diversified investor.

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

- What if the entrepreneur were to achieve the same risk by leveraging the market portfolio?
- Assuming the entrepreneur's portfolio consists of two assets, the project and the market, it has the following standard deviation:

$$\sigma_{\text{port}} = \sqrt{x_M^2\sigma_M^2 + x_P^2\sigma_P^2 + 2x_M x_P \rho_{M,P}\sigma_M\sigma_P}$$

Where $\rho_{M,P}$ is the correlation between the market and the project, and x_p and x_m are the weights invested in the project and the market respectively.

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

- With $x_p = 1/3$, $x_m = 2/3$, and the other assumptions shown, the portfolio standard deviation is

$$\sigma_{port} = \sqrt{(2/3)^2 0.15^2 + (1/3)^2 0.60^2 + 2(2/3)(1/3)(0.5)(0.15)(0.60)}$$
$$= 0.265 \quad \text{or} \quad 26.5\%$$

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

- The following formula allows us to calculate a portfolio's required return, using the total risk of the portfolio as compared to the market:

$$r_{Port} = r_F + (\sigma_{Port}/\sigma_M)RP_M$$

- Using the CAPM approach, the entrepreneur's required return on her risky portfolio is

$$\begin{aligned} r_{Port} &= r_F + (\sigma_{Port}/\sigma_M)(r_M - r_F) \\ &= 4\% + (26.5\%/15\%)(12\% - 4\%) \\ &= 18.1\% \end{aligned}$$

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

- The required return on the risky portfolio is a weighted average of the required return on the project and the required return on the market

$$r_{\text{port}} = x_P r_P + x_M r_M$$

- Which we can rearrange to solve for r_p, the project required return:

$$r_P = \frac{r_{\text{port}} - x_M r_M}{x_{\text{port}}} = \frac{18.1\% - (2/3)(12\%)}{(1/3)} = 30.3\%$$

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

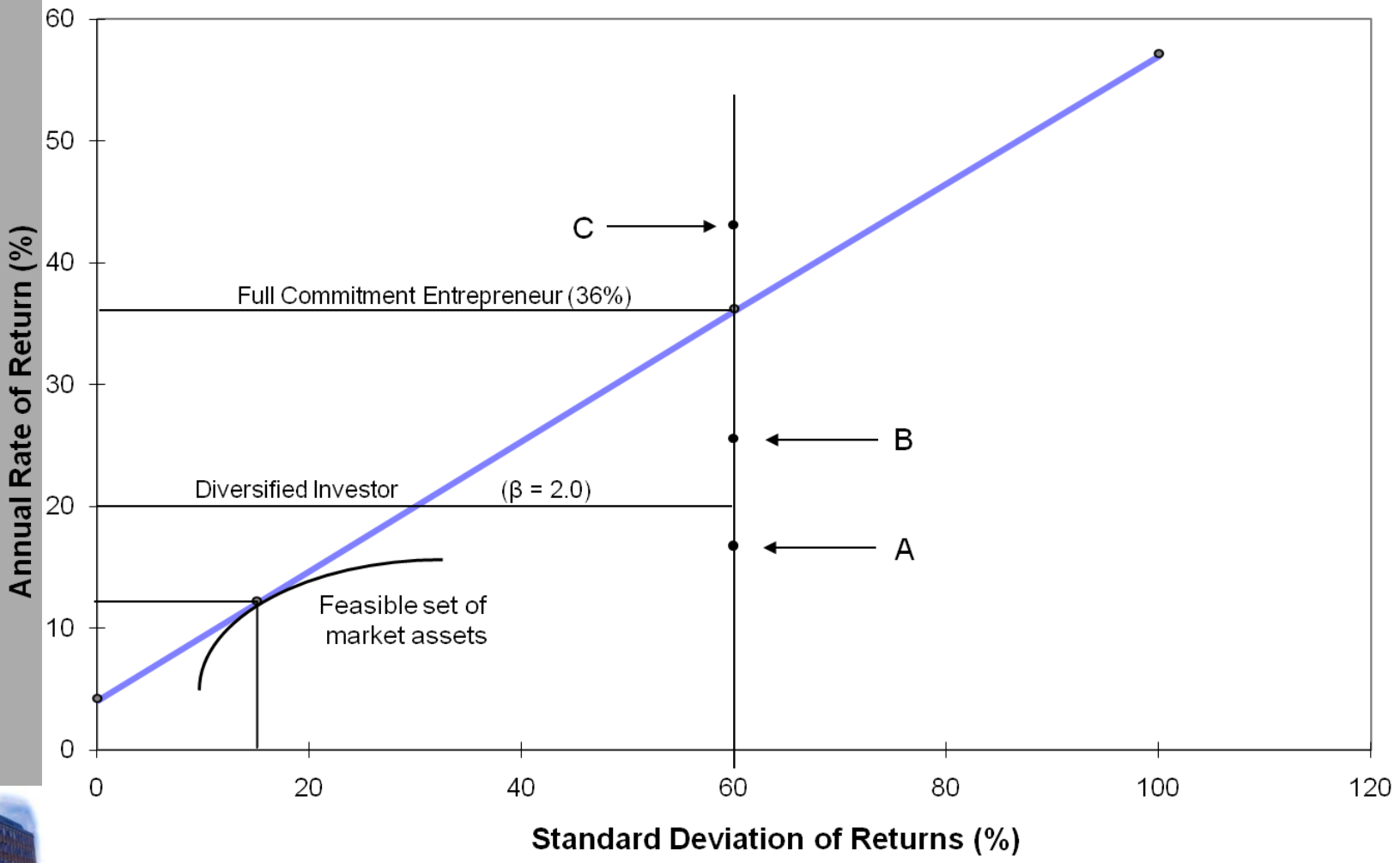
- The entrepreneur's opportunity cost of investing one-third of her wealth in the new venture is 30.3%
- This is 50% higher than the diversified investor's 20% required return and also higher than the expected return of 26%

$\Rightarrow$ if the entrepreneur invests one-third of her wealth in the venture, her expected NPV is negative

The Entrepreneur as an Underdiversified Investor: A Simple Illustration

- Summary
  - by controlling the fraction of wealth invested in the venture, the entrepreneur has some control over the cost of capital
  - if the entrepreneur is the sole investor, the choice of venture scale effectively determines the required return

Capital Market Line (CML) - Required Rates of Return



Comparisons of estimated project values for entrepreneurs making full commitments and for well-diversified investors

Beta = 2.0, σ=60%	**Project A**	**Project B**	**Project C**
Project Returns			
Annualized rate of return	16%	24%	42%
Terminal value (year 5)	$2,100,342	$2,931,625	$5,773,534
Entrepreneur Making a Full Commitment (required rate = 36%)			
Present value	$451,435	$630,106	$1,240,930
Net present value	($548,565)	($369,894)	$240,930
Well-Diversified Investor (required rate = 20%)			
Present value	$844,080	$1,178,154	$2,320,254
Net present value	($155,920)	$178,154	$1,320,254

The Entrepreneur's Commitment to a Venture

- A two-part commitment:
  - the financial capital commitment
  - the PV of the entrepreneur's human capital in its highest-valued alternative use

The Entrepreneur's Commitment to a Venture

- Three issues are of concern:
  1. How can we estimate the value of the entrepreneur's human capital?
  2. How can we estimate the value of the human capital that the entrepreneur commits to the venture?
  3. What should we assume about the risk and return to human capital that is not invested in the venture?

The Entrepreneur's Commitment to a Venture

- Commitment to a venture is defined in terms of the fraction of total wealth (human and financial capital) committed
  - full commitment would mean that the entrepreneur devotes all financial and human capital to the venture
  - in practice, no entrepreneur can make a full commitment
- Estimating realistic partial commitments

The Entrepreneur's Commitment to a Venture

Scenario 1

A 45 year-old entrepreneur has current salary of $150,000 and a net worth of $2.0 million, including $800,000 of liquid assets and $1.2 million in retirement savings

Plans to retire at age 60 and is considering committing $400,000 and 5 years to a new venture

Will receive a salary of $100,000 salary from the venture

Total wealth = financial wealth + human capital

= $2.0 million + $1.329 million

= $3.329 million

The Entrepreneur's Commitment to a Venture

Scenario 1 (cont'd.)

If he pursues the venture and it fails, he can return to his current salary of $150,000, but the growth rate will only be 4% annually for the remaining 10 years of his career.

The PV of his human capital if the venture fails is

$$PV_{\text{comp}} = \frac{\$100{,}000}{0.12 - 0.0}\left(1 - \frac{(1 + 0.0)^5}{(1 + 0.12)^5}\right) + \frac{\left[\frac{\$150{,}000}{0.12 - 0.04}\left(1 - \frac{(1 + 0.04)^{10}}{(1 + 0.12)^5}\right)\right]}{(1 + 0.12)^5}$$
$$= \$917{,}337$$

where the first term represents the 5-year venture salary, and the second is the $150,000 salary starting in the sixth year and growing 4% annually for 10 years.

The Entrepreneur's Commitment to a Venture

Scenario 1 (cont'd.)

The difference between the PV of his human capital if he stays at his current job versus committing five years to the venture is

$$\$1,318,973 - \$917,337 = \$411,636$$

This represents the human capital commitment to the venture. Adding this to the $400,000 financial commitment yields a total commitment of

$$\$411,636 + \$400,000 = \$811,636$$

Which, based on $3.3 million of total wealth, means the entrepreneur is committing 24% of total wealth to the venture.

The Entrepreneur's Commitment to a Venture

Scenario 2

21 year-old college graduate has a job offer (starting salary of $50,000, which is expected to grow 5% annually for 40 years) and no other financial wealth.

The student is considering committing 5 years to a new venture that would pay $25,000 per year.

PV of his human capital (if he takes the job):

$$PV_{\text{comp}} = \frac{\$50{,}000}{0.12 - 0.05}\left(1 - \frac{(1 + 0.05)^{40}}{(1 + 0.12)^{40}}\right) = \$660{,}245$$

The Entrepreneur's Commitment to a Venture

Scenario 2 (cont'd.)

If he pursues the venture and it fails, he can start his corporate career in the 6th year at a $50,000 salary which will grow 5% annually for 35 years.

The PV of his human capital if he pursues the venture and it fails

$$PV_{\text{comp}} = \frac{\$25{,}000}{0.12 - 0.0}\left(1 - \frac{(1 + 0.0)^5}{(1 + 0.12)^5}\right) + \frac{\left[\frac{\$50{,}000}{0.12 - 0.05}\left(1 - \frac{(1 + 0.05)^{35}}{(1 + 0.12)^{35}}\right)\right]}{(1 + 0.12)^5}$$
$$= \$453{,}082$$

where the first term represents the 5-year venture salary, and the second is the $50,000 salary starting in the 6th year and growing 5% annually for 35 years.

The Entrepreneur's Commitment to a Venture

Scenario 2 (cont'd.)

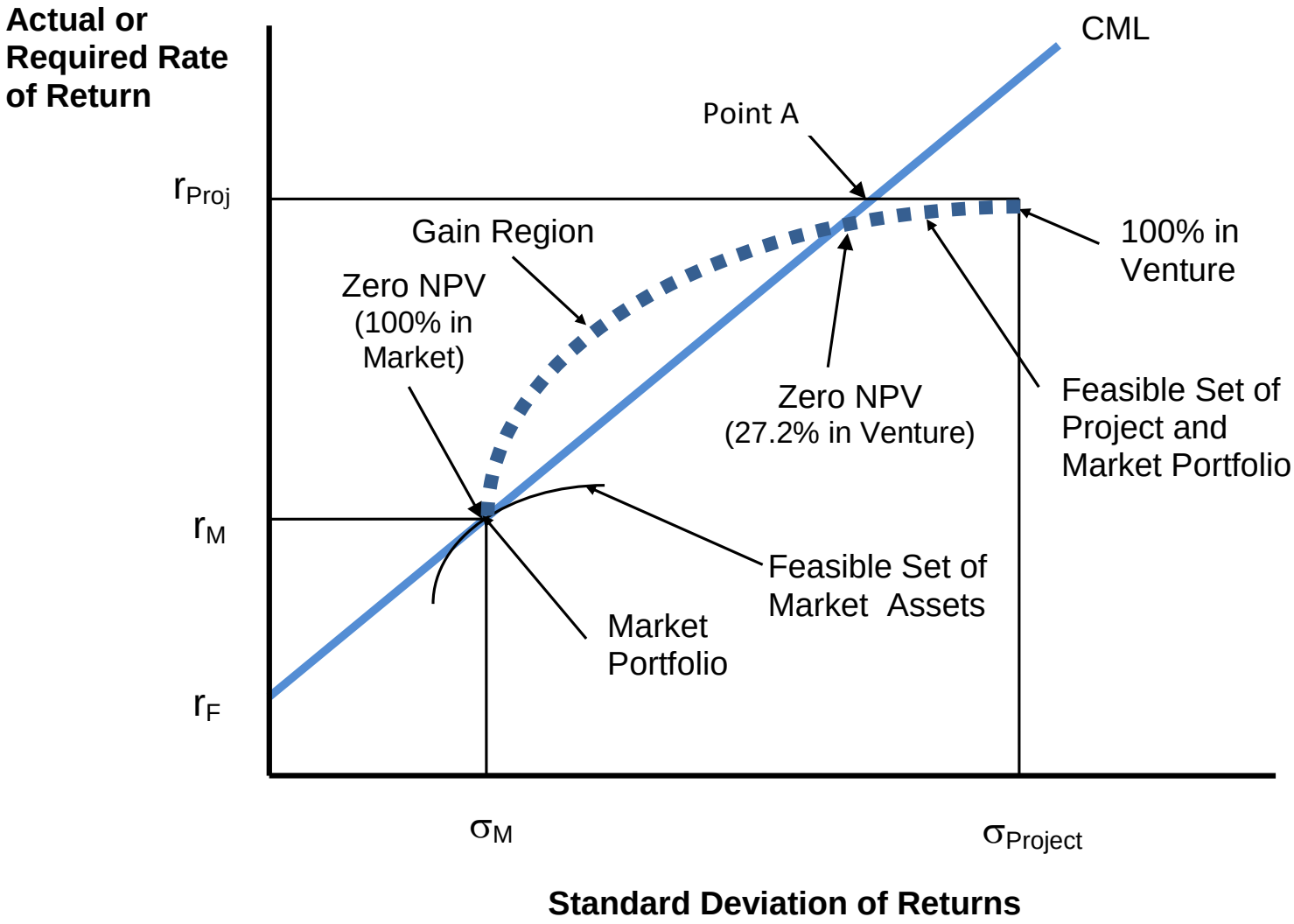
The difference between the PV of his human capital if he accepts the job offer versus committing 5 years to the new venture is

$660,245 - $453,082 = $207,163

This represents the entrepreneur's human capital commitment to the new venture. Since he has no financial wealth, his commitment to the new venture represents 31% of his total capital:

$207,163/$660,245 = 0.31 or 31%

Why Diversification Adds Value



A Sanity Check—The Art And Science Of Investment Decisions

- Assessing sensitivity to assumptions
- Using and misusing simulation
- Treatment of sunk costs in the valuation

The Entrepreneur's Perspective on Value - Summary

- Because the entrepreneur is not well-diversified, non-market risk affects value. Entrepreneurs have higher required returns than diversified investors and cannot rely on the valuations of diversified investors
- The main factor that can bring the entrepreneur's value closer to that of the outside investor is when the entrepreneur does not have to commit a very large fraction of total wealth to the venture
- Investments that are recoverable reduce the size of the entrepreneur's commitment and increase venture acceptability, as does shortening the length of the commitment
- Because the entrepreneur cares about total risk but the investor cares only about market risk, the disparity between their valuations is greater the higher the total risk of the venture compared with its market risk