

Evaluation of Portfolio Performance

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Portfolio Evaluation

- Comparing the return of the portfolios with a benchmark portfolios that is,
 - ▶ similar risk
 - ▶ similar constraints

Measures of Return

- Different from an initial investment concept.
 - ▶ Many inflows and outflows of funds to the portfolio.
 - ▶ Very different amount of money are invested in different point of time.

Table: Hypothetical Inflows and Outflows

	period			
	0	1	2	3
Value before inflow or outflow	100	110	231	55
Inflow (outflow)	0	100	-181	
Amount invested	100	210	50	
Ending value	110	231	55	

*the portfolio has increased in value by 10% in each period

That's why we will focus on returns, instead of cash flows.

Measures of Return

Table: Cash Flows and Return for Two Funds

	period			
	0	1	2	3
Rate of return earned by each manager	20	-10	10	
Fund A				
1. Value before inflow or outflow	100	240	126	138.6
2. Inflow (outflow)	100	-100	0	0
3. Amount invested	200	140	126	
4. Ending value	240	126	138.6	
Fund B				
1. Value before inflow or outflow	100	120	198	107.8
2. Inflow (outflow)	0	100	-100	0
3. Amount invested	100	220	98	
4. Ending value	120	198	107.8	

Ex. For Fund A and B the rate of return...

- 1st period return Fund A = $(240-200)/200 = 20\%$, Fund B = $(120-100)/100 = 20\%$
- 2nd period return Fund A = $(126-140)/140 = -10\%$, Fund B = $(198-220)/220 = -10\%$
- 3rd period return Fund A = $(138.60-126)/126 = 10\%$, Fund B = $(107.8-98)/98 = 10\%$

So both returns are the same $(1.20)(0.90)(1.10)-1 = 0.188$ or 18.8%

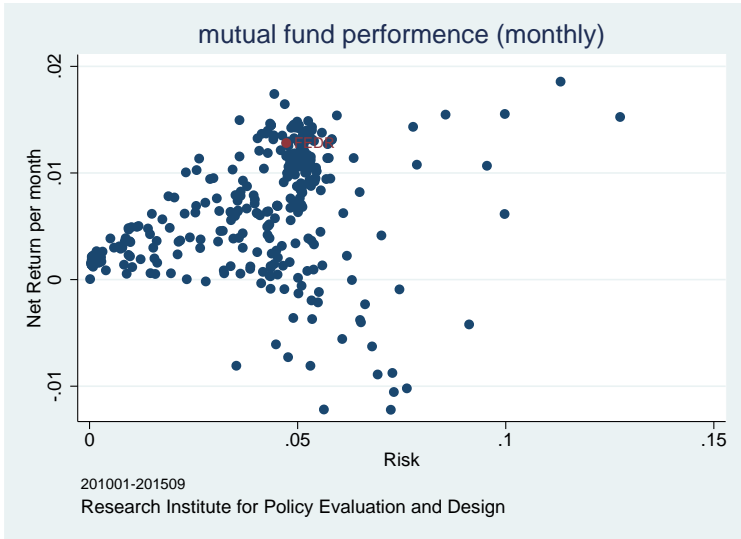
Measures of Risk

There are 2 possible measures of risk

- 1 “Total Risk ”is measured by Standard Deviation of Return
- 2 “Nondiversifiable Risk”is measured by the Beta Coefficient

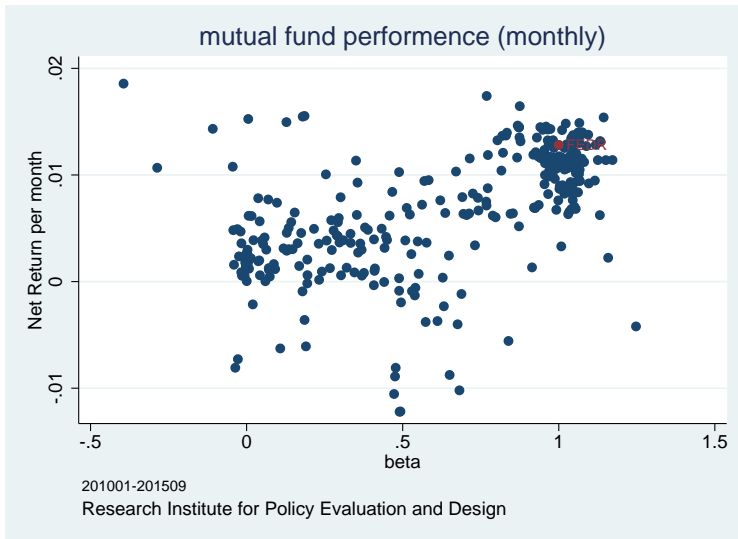
Measures of Risk

Total Risk



Measures of Risk

Nondiversifiable Risk



Direct Comparisons

Friend, Blume, and Crockett(1970)

Table: Comparison of Investment Performance of Mutual Funds and Random Portfolios (Jan. 1960 - June 1968)

Risk Class	Number in Sample		Mean Beta Coefficient					
	Mutual Funds	Equally Weighted Random Portfolios	Mutual Funds	Equally Weighted Random Portfolios	Mutual Funds	Equally Weighted Random Portfolios	Proportionally Weighted Random Portfolios, Variant 1	Proportionally Weighted Random Portfolios, Variant 2
Low risk (beta = 0.5 - 0.7)	28	17	0.614	0.642	0.091	0.128	0.116	0.101
Medium risk (beta = 0.7 - 0.9)	53	59	0.786	0.8	0.106	0.131	0.097	0.084
High risk (beta = 0.9 - 1.1)	22	60	0.992	0.992	0.135	0.137	0.103	0.092

One-Parameter Performance Measures

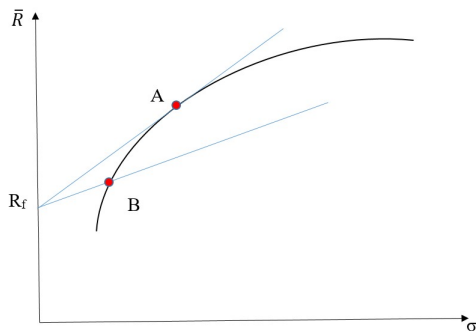
There are 4 different one-parameter performance measures.

- The Excess Return to Variability Measure : “Sharpe Ratio”
- Differential Return with Risk Measured by Standard Deviation
- Excess Return to Non-diversifiable Risk : “Treynor Ratio”
- Differential Return When Risk Is Measured by Beta : “Jensen alpha”

The Excess Return to Variability Measure

The Excess Return to Variability Measure

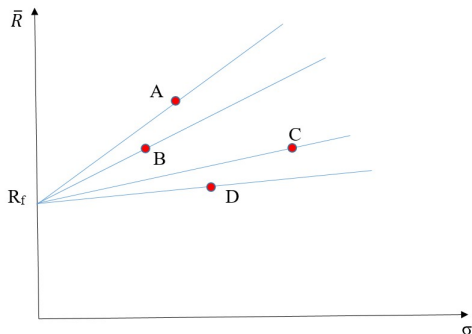
Figure: Combination of a riskless asset and a risky portfolio



The slope of the line is $\frac{\bar{R}_A - R_f}{\sigma_A}$

The Excess Return to Variability Measure

Figure: Combination of a riskless asset and some mutual funds



This ratio is one of measure utilized in portfolio evaluation “Sharpe measure” So Portfolio A better than B, C and D

The Excess Return to Variability Measure

จากข้อมูลกองทุนทุกประเภท และ risk free rate นิยามโดย อัตราผลตอบแทนของตัวเงินคั่งอายุ 1 เดือน ซึ่งเป็นข้อมูลรายเดือนตั้งแต่ มกราคม 2010 จนถึง กันยายน 2015

Table: กองทุนที่เรียงลำดับด้วยวิธี sharpe ratio

order	fund_name_eng	initial_name	policy	sharpe
1	KA Corporate Bond Fund	KACB	Fixed Income Fund	0.456608732
2	Asset Plus Active Fixed Income Fund 4	ASP-ACFIXED4	Fixed Income Fund	0.446712868
3	KA Short Term Fixed-Income Fund	KASF	Fixed Income Fund	0.436769934
4	Stable Income Fund 6M1	SIF-6M1	Fixed Income Fund	0.416390179
5	Krungsri Specific Flexible Fund	KFSF	Non-specified Equity	0.391464048
6	Bualuang Global Health Care Fund	BCARE	EQ	0.362456529
7	MFC Property Wealth Fund	M-PROPERTY	Other	0.358830074
8	ONE PROPERTY PLUS FUND	ONE-PROP	Other	0.352446411
9	ONE FIXED INCOME AUTOMATIC REDEMPTION FUND	ONE-FAR	Fixed Income Fund	0.35242987
10	Aberdeen Small Cap Fund	ABSM	EQ	0.349419845

The Excess Return to Variability Measure

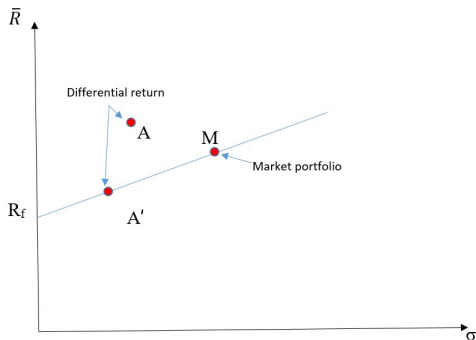
จากข้อมูลกองทุนกองทุนที่เน้นลงทุนในตราสารทุน และ risk free rate นิยามโดย อัตราผลตอบแทนของตัวเงินคลังอายุ 1 เดือน ซึ่งเป็นข้อมูลรายเดือนตั้งแต่ มกราคม 2010 จนถึง กันยายน 2015

Table: กองทุนกองทุนที่เน้นลงทุนในตราสารทุนที่เรียงลำดับด้วยวิธี sharpe ratio

order	fund_name_eng	initial_name	policy	sharpe ratio
1	Bualuang Global Health Care Fund	BCARE	EQ	0.362457
2	Aberdeen Small Cap Fund	ABSM	EQ	0.34942
3	Bualuang Top-Ten Fund	BTP	EQ	0.310341
4	BuaKaew Open-end Fund	BKA	EQ	0.293536
5	Bualuang Equity RMF	BERMF	EQ	0.288795
6	BuaKaew 2 Open-end Fund	BKA2	EQ	0.288651
7	Bualuang Long - Term Equity Fund	B-LTF	EQ	0.288509
8	BUALUNG CAPITAL OPEN-END FUND	BCAP	EQ	0.284623
9	Aberdeen Smarty Capital Retirement Mutual Fund	ABSC-RMF	EQ	0.281878
10	Aberdeen Growth Fund	ABG	EQ	0.278249

Differential Return with Risk Measured by Standard Deviation

Figure: The determination of differential return



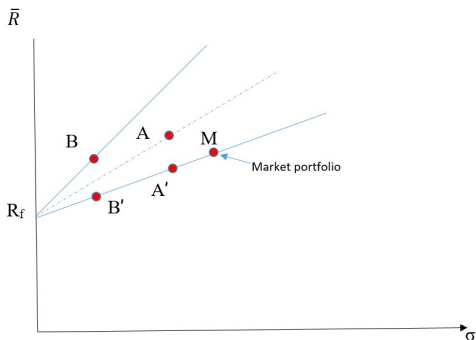
The equation of the market line is $\hat{R}_A = R_f + \frac{\bar{R}_m - R_f}{\sigma_m} \sigma_A$

The difference between A and A' tells us the performance of A relative to A'

Larger differential return \rightarrow better portfolio.

Differential Return with Risk Measured by Standard Deviation

Figure: Effect of measure on ranking



The Sharpe measure ranks B better than A

The different return index rank A better than B

Differential Return with Risk Measured by Standard Deviation

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Table: กองทุนที่เรียงลำดับด้วยวิธี Differential Return with Risk Measured by Standard Deviation

order	fund_name_eng	initial_name	policy	Differential Return
1	Aberdeen Small Cap Fund	ABSM	EQ	0.005265891
2	Bualuang Global Health Care Fund	BCARE	EQ	0.004743516
3	Bualuang Top-Ten Fund	BTP	EQ	0.003731265
4	MFC Property Wealth Fund	M-PROPERTY	Other	0.003371869
5	ONE PROPERTY PLUS FUND	ONE-PROP	Other	0.002815877
6	Buakaew Open-end Fund	BKA	EQ	0.002721638
7	Bualuang Equity RMF	BERMF	EQ	0.002528785
8	Buakaew 2 Open-end Fund	BKA2	EQ	0.002520563
9	Bualuang Long - Term Equity Fund	B-LTF	EQ	0.002515647
10	Aberdeen Value Fund	ABV	Non-specified Equity	0.002436342

Differential Return with Risk Measured by Standard Deviation

จากข้อมูลกองทุนกองทุนที่เน้นลงทุนในตราสารทุน และ risk free rate นิยามโดย อัตราผลตอบแทนของตัวเงินคลังอายุ 1 เดือน ซึ่งเป็นข้อมูลรายเดือนตั้งแต่ มกราคม 2010 จนถึง กันยายน 2015

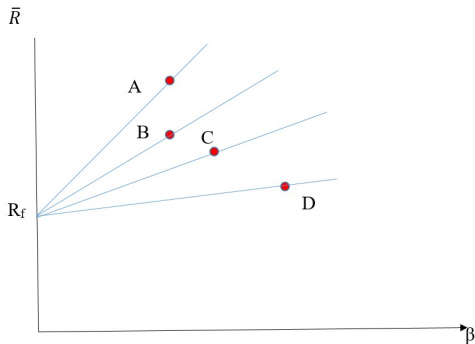
Table: กองทุนกองทุนที่เน้นลงทุนในตราสารทุนที่เรียงลำดับด้วยวิธี Differential Return with Risk Measured by Standard Deviation

order	fund_name_eng	initial_name	policy	diffreturn_sd
1	Aberdeen Small Cap Fund	ABSM	EQ	0.005266
2	Bualuang Global Health Care Fund	BCARE	EQ	0.004744
3	Bualuang Top-Ten Fund	BTP	EQ	0.003731
4	Buakaew Open-end Fund	BKA	EQ	0.002722
5	Bualuang Equity RMF	BERMF	EQ	0.002529
6	Buakaew 2 Open-end Fund	BKA2	EQ	0.002521
7	Bualuang Long - Term Equity Fund	B-LTF	EQ	0.002516
8	BUALUNG CAPITAL OPEN-END FUND	BCAP	EQ	0.002226
9	Aberdeen Smarty Capital Retirement Mutual Fund	ABSC-RMF	EQ	0.002186
10	Aberdeen Growth Fund	ABG	EQ	0.002013

Excess Return to Non-diversifiable Risk

- Recall that the slope of the market line is $\frac{\bar{R}_A - R_f}{\sigma_A} = \frac{\text{Excess return}}{\text{Total risk}}$

Figure: Treynor measure



- But this measure suggested by Treynor (1965) is $\frac{\bar{R}_A - R_f}{\beta_A} = \frac{\text{Excess return}}{\text{Systematic Risk}}$
Called “Treynor measure”

Key : care only systematic risk, measure by β

Excess Return to Non-diversifiable Risk

จากข้อมูลกองทุนทุกประเภท และ risk free rate นิยามโดย อัตราผลตอบแทนของตัวเงินคลังอายุ 1 เดือน ซึ่งเป็นข้อมูลรายเดือนตั้งแต่ มกราคม 2010 จนถึง กันยายน 2015

Table: กองทุนที่เรียงลำดับด้วยวิธี Treynor

order	fund_name_eng	initial_name	policy	treynor
1	TMB Money Retirement Mutual Fund	TMBRMF	Fixed Income Fund	631.1823204
2	CIMB-Principal Daily Fixed Income Fund	CIMB-PRINCIPAL DAILY FIX	Fixed Income Fund	478.0808511
3	ONE FIXED INCOME AUTOMATIC REDEMPTION FUND	ONE-FAR	Fixed Income Fund	80.43504996
4	Aberdeen Cash Creation Fund	ABCC	Fixed Income Fund	50.98643148
5	TMB Corporate Bond Fund	TMBCB	Fixed Income Fund	50.1610984
6	Thanachart Money Market Fund	T-MONEY	Fixed Income Fund	40.6079566
7	CIMB-Principal Daily Treasury Fund	CIMB-PRINCIPAL TREASURY	Fixed Income Fund	40.07546495
8	Krung Thai Money Market RMF 4	RMF4	Fixed Income Fund	38.28153689
9	Solaris Money Plus Fund	S-MMF	Fixed Income Fund	30.35641164
10	TMB Treasury Money Fund	TMBTM	Fixed Income Fund	30.25189805

Excess Return to Non-diversifiable Risk

จากข้อมูลกองทุนกองทุนที่เน้นลงทุนในตราสารทุน และ risk free rate นิยามโดย อัตราผลตอบแทนของตัวเงินคลังอายุ 1 เดือน ซึ่งเป็นข้อมูลรายเดือนตั้งแต่ มกราคม 2010 จนถึง กันยายน 2015

Table: กองทุนกองทุนที่เน้นลงทุนในตราสารทุนที่เรียงลำดับด้วยวิธี Treynor

order	fund_name_eng	initial_name	policy	treynor
1	1 A.M. Smart Long Term Equity Fund	1SMART-LTF	EQ	0.698887
2	Bualuang Global Health Care Fund	BCARE	EQ	0.016842
3	Aberdeen Small Cap Fund	ABSM	EQ	0.005983
4	Bualuang Top-Ten Fund	BTP	EQ	0.004169
5	Good Corporate Governance Long Term Equity Fund	CG-LTF	EQ	0.002261
6	Buakaew Open-end Fund	BJA	EQ	0.0021
7	1 A.M. SET 50 Fund	1AMSET50	EQ	0.001964
8	Sinpinyo Four Open-end Fund	SF4	EQ	0.001939
9	Bualuang Equity RMF	BERMF	EQ	0.001928
10	Bualuang Long - Term Equity Fund	B-LTF	EQ	0.001911

Differential Return When Risk Is Measured by Beta

- We can also modify the differential gap measure in a similar manner as follows :
- We will predict the return by $\hat{R}_A = R_f + (\bar{R}_m - R_f)\beta_A$
Example :Assume the market return is 10%, risk-free rate is 5% and Beta on the portfolio being evaluated is 0.8. The expected return is ?

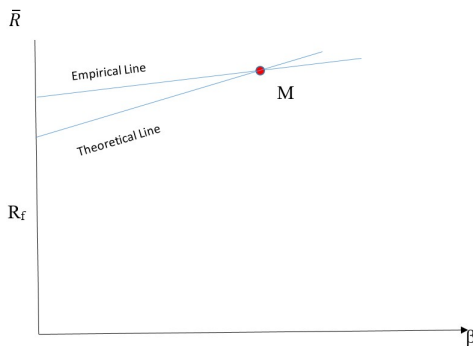
$$\hat{R}_A = 5 + (10 - 5)0.8 = 9\% \quad (1)$$

- $\hat{\alpha}_A = \bar{R}_A - \hat{R}_A$
 $\hat{\alpha}_A = \bar{R}_A - (R_f + (\bar{R}_m - R_f)\beta_A)$
- This measure is proposed by Jensen (1968), so it is called “Jensen measure”
Example : $\bar{R}_A - 9 = ?$

Jensen measure

- The CAPM model is $\hat{R}_A = R_f + (\bar{R}_m - R_f)\beta_A$
- The zero-beta CAPM is $\hat{R}_A = R_z + (\bar{R}_m - R_f)\beta_A$

Figure: Empirical and theoretical CAPM



Jensen measure

Table: กองทุนที่เรียงลำดับด้วยวิธี Jensen measure

order	fund_name_eng	initial_name	policy	Jensen measure
1	Vaypak Fund 1	VAYU1	Non-specified Equity	0.020970165
2	Bangkok Capital Fund	BCF	Other	0.01361333
3	Enrich Property and Loan Fund	ENRICH	Other	0.013298925
4	Asset Plus Nippon Growth Fund	ASP-NGF	Other	0.011904835
5	Bualuang Global Health Care Fund	BCARE	EQ	0.011667283
6	Gamma Capital Fund	GCF	Other	0.011614649
7	Siam Resort Fund	SRF	Other	0.011611935
8	The Asia Recovery 1 Fund	ARF1	Other	0.009363458
9	Aberdeen Small Cap Fund	ABSM	EQ	0.007121199
10	MFC Property Wealth Fund	M-PROPERTY	Other	0.005626658

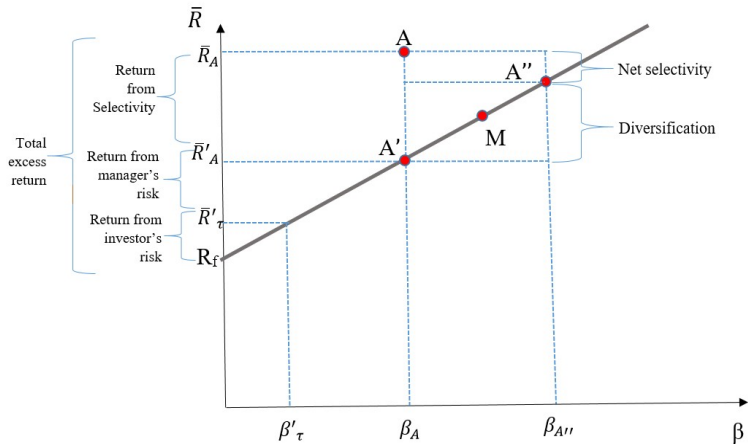
Jensen measure

Table: กองทุนที่เน้นลงทุนในตราสารทุนที่เรียงลำดับด้วยวิธี Jensen measure

order	fund_name_eng	initial_name	policy	Jensen measure
1	Bualuang Global Health Care Fund	BCARE	EQ	0.011667
2	Aberdeen Small Cap Fund	ABSM	EQ	0.007121
3	Bualuang Top-Ten Fund	BTP	EQ	0.005011
4	TISCO US Equity Fund	TISCOUS	EQ	0.004437
5	Asset Plus S&P 500 Fund	ASP-S&P500	EQ	0.003507
6	Buakaew Open-end Fund	BKA	EQ	0.00326
7	Bualuang Equity RMF	BERMF	EQ	0.003072
8	Bualuang Long - Term Equity Fund	B-LTF	EQ	0.003065
9	Buakaew 2 Open-end Fund	BKA2	EQ	0.003055
10	Aberdeen Smarty Capital Retirement Mutual Fund	ABSC-RMF	EQ	0.002968

Decomposition of Overall Evaluation

Figure: Decomposition of performance by Fama(1982)



$$*\beta_{A''} = \sqrt{\frac{\sigma_{A''}^2}{\sigma_m^2}}$$

Decomposition of Overall Evaluation

Portfolio performance generally measures

- Diversification (What have been discussed so far)
 - 1 How much of the risk incurred by the portfolio is due the market movements?
 - 2 How much is due to unique movements of the individual securities in the portfolio?
- Timing
 - 1 How successful have mutual funds been in timing market movements?
 - 2 How is timing?

Decomposition of Overall Evaluation

- What is “Timing” or “Market Timing” ?
- Adjust the average Beta on the portfolio
 - 1 If market is expected to increase. → Sell bonds and purchase stocks.
 - 2 If market is expected to decline. → Sell stocks and purchase bonds.
- Way to measure “Manager Timing’s Ability”
 - 1 Graphically market movements versus bond-stock mix or average Beta.
 - 2 Plot portfolio Beta compare to the market return.
 - 3 Compare fund return and market return.

Market Timing

Treynor and Mazuy(1966)

$$R_{it} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + c_i(R_{mt} - R_{ft})^2 + \epsilon_{it} \quad (2)$$

or

$$R_{it} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + c_i D_t (R_{mt} - R_{ft}) + \epsilon_{it} \quad (3)$$

where the dummy variable

$$D_t = 0 \text{ if } (R_{mt} - R_{ft}) \geq 0$$

$$D_t = 1 \text{ if } (R_{mt} - R_{ft}) < 0$$

So, c_i is difference between the up-market Beta and the down-market Beta A successful market timing will have a positive c_i

Market Timing

จากข้อมูลกองทุน "ABSM" และ risk free rate นิยามโดย อัตราผลตอบแทนของตัวเงินคลังอายุ 1 เดือน ซึ่งเป็นข้อมูลรายเดือนตั้งแต่ มกราคม 2010 จนถึง กันยายน 2015 มาตรวจสอบ โดยใช้แบบจำลองที่(2)

Table: ค่าสัมประสิทธิ์ที่หาได้จากแบบจำลองที่ (2)

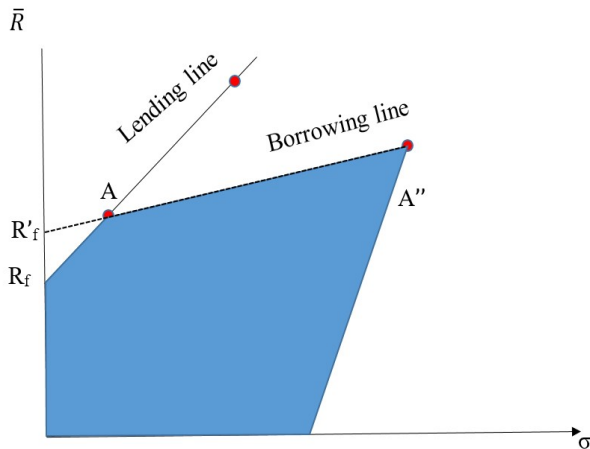
	a_i	b_i	c_i
Coefficients	0.004766	0.778596	0.971447
Standard Error	0.004059	0.066658	1.041064
t Stat	1.174184	11.68052	0.933129
P-value	0.244541	1.02E-17	0.354155

so, c_i is indifference between the up-market Beta and the down-market Beta

Problems in Portfolio Measurement

Problem about Lending and Borrowing Rate

- If borrowing rate is higher/lower than the lending rate.



Problems in Portfolio Measurement

Changing risk level (Changing in Beta)

- If market expected to move up/down, Some manager change average Beta by changing the type of stock held.

Figure: Return with changing Beta

