Chapter 1
RISK & RETURN ANALYSIS

This chapter will cover the basic concepts of risk and return and what constitutes a satisfactory investment portfolio. The chapter will also examine return expectation for specific asset classes such as stocks and bonds and walk through the reader on how to use the two different analytical approaches to determine the risk return balance. These methods being fundamental and technical analysis.

Learning Objectives

After reading this chapter, students will be able to:

- Compute various measures to calculate the historical and expected returns on many asset classes such as equities and bonds.
- Quantify the risk on these asset classes by calculating the variance and standard deviation.
- Understand how to measure past performance of stocks and bonds using both historical analysis and scenario analysis to determine the expected risk/return going forward.
- Construct a portfolio of investments consisting of stocks, bonds and risk-free investments such as cash, money market or treasury bills and the impact of diversification.
- Understand portfolio optimization and efficiency based on asset allocation between stock, bonds and cash.

Rates of Return Overview

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AUTHOR'S NOTES:
A joke that I heard many years ago makes a perfect introduction to investment return expectation and it goes like this: John woke up one morning and looked at the clock and it was 7:07am. Then he looked at the calendar and the day was July 7 or 7/7. He noticed that the 7s could be the theme of the day. As he was running out of the door he stopped at his mailbox and he opened an envelope with his weekly paycheck that had a check for $777.77. As he was crossing the road, he almost got hit by a car that stopped inches short of his body. The car's license number was GGG 777 – very strange he moans considering that G is also the 7th letter of the alphabet. He looked up and saw that the seven bus was approaching the station. So, he had to get on it. He was sure that this was a sign. He asked the bus driver when the next station is, and the bus driver said: "the seventh station". He said to himself: "I need to get off the bus at the next station". After he got off the bus he looked up and saw a building in front of him: "77 on 7th Avenue" posted on top of the door. He walked in to the building as he was sure by now that this is a sign. In the lobby of the building there was an Off-Track Betting (OTB) store where patrons can bet on horse races without being at the racetrack. John walked in and asked when the next race is. He was told that the next race is

the 7th race and he had exactly 7 minutes before post time. He then asked how many horses race in this 7th race. Seven horses, someone shouted. He then asked what are the odds that the horse with number 7 will win. "Don't bother" somebody shouted, "this is a long shot… 77 to 1 to win". John thought to himself: "this is it". He approached the betting window and said: "here is my paycheck of $777.77. Put it all for 7 to win…. I am feeling it he shouted". Of course, with 77 to 1 odd his payoff will be huge making approximately $60,000 on $777.77 bet if the 7 horse wins. The race was over……. and the number 7 horse came in 7th. You see this is a funny way of explaining the investment expectation based on trends – of course this bet or investment is all based on behavioral return expectation which is very difficult to predict since there was no mathematical basis. Such behavioral analysis which in many cases dictates why someone buys or sells the stock won't be covered in this chapter. They are many books written on behavioral finance that discusses various interesting observations that challenges the traditional analytical tools of risk and return analysis. The other measurements of risk & return expectations that this chapter and this unit will cover are through fundamental and technical analyses.

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KEY TAKEAWAYS:

- *Before investing, the investor needs to consider the following four factors:*
    1. *measure the expected return*
    2. *quantify the risk;*
    3. *how to allocate the investments; and*
    4. *time or determine the exit strategy or realization of the investment.*
- *To determine the return expectation or predict the investment payoff, the analyst could use fundamental analysis, technical analysis or behavioral analysis. The chapter will focus on the first two.*
- *By allocating the investments across different asset classes including stocks, bonds and cash, the investors can diversify their risk and achieve portfolio efficiency which is the point where you achieve the highest possible return at the lowest possible risk.*
- *The analyst can also determine the future risk/return expectation by analyzing the historical trends and apply various economic scenarios based on probability outcomes such as the expected performance under recessionary or economic boom environment.*

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Before you invest your money in any securities or any businesses, **it's extremely important to consider and must measure the following four factors:**

1. **Return Expectation**
2. **Risk**
3. **Allocation**
4. **Time**

All these are essential to build investment expectation. The investor needs to determine return expectation first. Without any expectations the investor should not proceed with the investment.

The expectation comes with risk appetite of the individual investor, but the basic standard expectation needs to be set before the investor makes and adjustments based on the risk that he or she is willing to take. The basic premise of course is that the higher the risk the higher the return expectation. This and the following chapters will be discussing this relationship in depth. We will examine a possibility that when the investor allocates his/her investments across different assets will not only diversify the risk but can also achieve efficiency or attempt to better balance the risk with the return. One of the most important components of achieving this measurement is to have an exit strategy or set the time when the investor can realize the investment.

Return and Return Expectation

Objective of Return and Return Expectation

As discussed previously, it is essential to measure the historical returns of a particular asset class and then set an expectation going forward based on various methods that we will examine in this section. The return analysis objectives are as follows:

- To compare to historical trends of this particular investment and project the trend going forward and adjust such trend based on views for driving such investment
- To compare to other asset classes and/or the market, and/or the risk-free rate.
- To compare to last year's expectations – continue to test the performance versus expectation

If all three objectives are met, then the assessment is completed. For example, just giving a rate of return number like 10% by its self is not enough. Though 10% return in a year seems like a good return, but if it was achieved in April of 1979, for example, that rate of return would have been terrible since the risk-free 3-month treasury rate and inflation were 9.8% and 11.35% respectively.

Rates of Return – Holding Period Return (HPR)

The first basic measurement of return does not consider the time that length of time that which the return was achieved is the Holding Period Return (HPR). HPR is focused on what the net return over the investment life. It measures the rate of return from the time the investor initiated the investment until the investment was realized – basically the rate of return for the holding period whether is one month or 5 years. The ratio in its most basic form is:

$$\text{HPR} = \frac{CF}{I}$$

Where CF is the Cash Flow (inflow and outflow) during the investment period and I is the initial investment. For example, if an investor buys the stock for $100 and sells it for $120 and during the investment he or she received $2 dividend then the cash flow on the numerator will be $120 of proceeds for selling the stock plus $2 of cash dividend received (cash inflow) minus the initial investment of $100 (cash outflow) the net cash flow will be $22 ($120 + $2 - $100). The HPR will

be calculated by dividing the net cash flow of $22 by the initial investment of $100 resulting to a 22% return:

$$\frac{(120 - 100 + 2)}{100} = \frac{22}{100} = 0.22 = 22\%$$

For a quick analysis of expected return, the HPR ratio which represents the relationship between cash flow to the initial investment can be found in many applications on various asset classes. For example, let's assume the investor is interested in buying a bond that has an 8% per year coupon rate or annual interest income of $80 on a $1,000 bond and the secondary market price of the bond is 95% of par or $950. To calculate the expected return or the current yield (CY) in bond "talk" the numerator of $80 representing the annual expected payment or cash flow and the denominator of $950 representing the purchase price of the bond or initial investment will calculate the expected annual return of 8.42%:

$$CY = \frac{CF}{I} = \frac{Annual\ Coupon\ Payment}{Market\ Price\ of\ the\ Bond} = \frac{80}{950} = 0.0842 = 8.42\%$$

In many cases an expected return (discussed in depth later) that the investor sets as a target before making the investment determines the initial investment needed to achieve the expected cash flow. Using the bond example above were the annual coupon payment of $80 is already set based on the bond agreement (indenture) but in this case the investor desires a 10.0% return based on new measured risk assessment of this bond, then to achieve 10.0% the numerator will be $80 divided by the expected return of 0.10 or 10.0% calculating the initial investment needed $800.00 by solving for Investment (I):

$$since\ CY = \frac{CF}{I}, then\ CF = (CY).(I)\ and\ I = \frac{CF}{CY} = \frac{80}{.10} = \$800.00$$

This relationship between cash flow, investment, return and time are the basic variables calculating "Time Value of Money" discussed in many finance text books where the cash flow is the expected cash flow to be received in the future or future value (FV) minus the investment, the investment representing today's investment or present value (PV) and return or expected return is the interest rate (i) at a set time (t). Showing below how this ratio of HPR can translate to the concept of "Time Value of Money":

$$HPR = \frac{CF}{I}\ or\ i = \frac{(FV - PV)}{PV}\ or\ i = \frac{FV}{PV} - \frac{PV}{PV}\ or\ i = \frac{FV}{PV} - 1$$

$$then\ present\ value\ (PV)\ is$$

$$PV = \frac{FV}{(1+i)} \; for \; in \; one \; year$$

$$or \; PV = \frac{FV}{(1+i)^t} \; in \; future \; year \; t$$

and to calculate future value (FV)

$$\text{FV} = \text{PV}\ (1+i)^t$$

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Excel formulas for Present Value, Future Value and Rate of Return:

= PV (rate, years, future value)
=FV (rate, years, present value)
=Rate (years, future value, -present value)

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When trying to calculate the annual rate instead of the total rate of return for the entire investment hold period, then this rate is referred to as the Internal Rate of Return or IRR covered in the next section below.

Rates of Return –Annual Rate of Return (ROR) and Internal Rate of Return (IRR)

The concept of "Time Value of Money" is mostly used for calculating the annual rate of return as the basis of comparing such return to other years, or to the risk-free rate to establish the risk premium – explained in later chapters. The relationship between todays' investment to future expectation for given years will result to an annual rate of return.

Starting with the basic time value of money formula of Present Value, the formula is:

$$PV = \frac{FV}{(1+i)^t} \; in \; future \; year \; t$$

where it calculates the initial investment needed to achieve at set future payoff in year "t" at the annual rate of return (ROR) or "i". For example, what do you need to invest today to receive $100 in 5 years at 5% return per year? Based on the calculation below, you need to invest $78.35:

$$pv = \frac{\$100}{(1+0.05)^5} = \frac{100}{1.2763} = \$78.35$$

If we know what we need to invest today at an annual rate "i", and we are trying to calculate what the investment will be "t" years, then the formula is:

$$\text{FV} = \text{PV}\ (1 + i)^t$$

For example, if you invest $100 today for 5 years and expect 5% return per year, you investment will be calculated to grow to $127.63:

$$Fv = \$100(1 + 0.05)^5 = \$100\ (1.2763) = \$127.63$$

To then reverse this formula to calculate the annual rate of return (ROR). The formula is:

$$(1 + i)^t = \frac{FV}{PV}\text{, then } i = \sqrt[t]{\frac{FV}{PV}} - 1$$

For example, if you invest $100 today and expect is 5 year a payoff of $127.63 what is the rate of return per year? The calculation below shows 5.0% annual return:

$$i{=}5127.63100i = \sqrt[5]{\frac{127.63}{100}} - 1 = 1.05 - 1 = 0.05 = 5\%$$

For an investment that the investor who receives annual cash flows during the investment period, the ROR calculation is a little more challenging than a one-time payment in the future. If the cash flows from the investment are the exact same amount for every year then the annual cash flows over the investment represent the annual return including original investment amount – similar to a bond investment that the investor receives annual or semi-annual fixed payments and a one-time principal payment at maturity of the bonds or early repayment (sometimes refer to as redemption).

For example, if we invest $100 to an investment that pays $5 fixed per year for 5 years plus receiving the initial investment of $100 in year 5, then the annual (ROR) will be 5%.

The more challenging calculation is if the payment is different every year, so the annual rate of return must be weighted based on size and the year paid. This type of rate return method is the Internal Rate of Return. Its challenging because each year the investment would have different payoffs and sometimes negative numbers. The best approach to calculate the IRR is using spreadsheet analysis. The formula that will be used throughout this book is =IRR (CF_0, CF_1, CF_2, CF_3….CF_t).

Insert Figure 1.1

Internal Rate of Return (IRR)

Dollar Weighted Return (Even Annual Payments)

	0	1	2	3	4
Net CF ($)	-100	5	5	5	105

	Excel	B	C	D	E	F
10	IRR	0	1	2	3	4
11	5.00%	-100	5	5	5	105

=IRR(B11:F11)

Dollar Weighted Return (Uneven Annual Payments

	0	1	2	3	4
Net CF ($)	-100	-9	-5	26	110

$$1 = + (-0.1 / (1+IRR) + (-0.5 / (1+ IRR)\ ^2 + (0.8 / (1+ IRR)^3) + (1.0 / (1+IRR)^4$$

	Excel	B	C	D	E	F
10	IRR	0	1	2	3	4
11	4.96%	-100	-9	-5	26	110

=IRR(B11:F11)

Figure 1.1

Rates of Return – Average Annual Rate of Return

The average annual rate of return can be calculated by looking at 5 to 10 years of historical returns and averaging them to represent the annual return. It gives the investor an indication what to expect on an average. This method is used for comparing to other investments calculated the same way and by taking this number to the next level of assessment how volatile in the return as compared to the average on a given year. We will examine relationship between the rate of return and volatility which measure the risk of such investment. They are two methods of calculating the risk/return: Historical and Scenario Analysis method.

Historical Method:

The most commonly used assessment of risk and return is to look at historical information prices for stocks or bonds or any other asset classes. Though, not perfect, the historical average shows how the investment perform through the years that includes all the high points, the low points, positive and negative points. **The deviation from the average, called standard deviation represents how risky the return could be so when two portfolios have the same average return, the one that is less risky is the one with the lower standard deviation**. Figure 1.2 shows that both 10-year average return for portfolios A and B is 9.92% but Portfolio B is slightly riskier with standard deviation of 14.7% versus 13.62% of Portfolio A. In this and follow-on chapters we will examine closer this relationship and how we can compare this to the market or other asset classes.

Insert Figure 1.2

HISTORICAL RETURN ANALYSIS

PORTOLIO A

Year	ROR	Deviation to return (X-Avg(X))	SQRT Deviation
1	16.9%	16.9%	2.856%
2	31.3%	23.0%	5.290%
3	5.0%	5.0%	0.250%
4	-2.0%	-2.0%	0.040%
5	2.0%	2.0%	0.040%
6	12.0%	12.0%	1.440%
7	22.0%	22.0%	4.840%
8	12.0%	12.0%	1.440%
9	-5.0%	-5.0%	0.250%
10	5.0%	5.0%	0.250%
Total	99.2%		16.696%

Observations= 10 n
Average = **9.920%** Total ROR / n
Variance = 1.855% / (n - 1) * Sq Dev
Standard Dev.= **13.62%**

PORTOLIO B

Year	ROR	Deviation to return (X-Avg(X))	SQRT Deviation
1	19.9%	15.0%	2.250%
2	15.0%	15.0%	2.250%
3	8.0%	8.0%	0.640%
4	-11.0%	-11.0%	1.210%
5	7.0%	7.0%	0.490%
6	14.0%	14.0%	1.960%
7	24.0%	24.0%	5.760%
8	20.0%	20.0%	4.000%
9	-5.4%	-5.4%	0.292%
10	7.7%	7.7%	0.593%
Total	99.2%		19.445%

Observations= 10 n
Average = **9.920%** Total ROR / n
Variance = 2.161% ' (n - 1) * Sq Dev
Standard Dev.= **14.70%**

Figure 1.2

Scenario Analysis Method:

The previous section goes over the calculation of historical average returns, variance and standard deviation. This section will calculate the expected return, variance and standard deviation when the information we are using is adjusted based on the probability of various economic scenarios. The aim is to examine that effect of these forces on the performance of a given portfolio. This method will then be used to recalculate the expected return, variance and standard deviation representing the risk, when two or more asset classes are added to an all equity portfolio. Depending on the correlation between the performance of different asset classes such as stocks and bonds, the analysis should demonstrate that the portfolio can achieve both efficiency and optimization. **The efficiency, called efficient frontier, which is at the highest possible return with the lowest possible risk could be achieved by trading partially out of stocks into bonds and vice versa**. After the efficiency is achieved, then the portfolio manager will look to optimize the portfolio. The optimization can be achieved by moving from the efficiency position to a position where the analyst is seeking additional return with minimum additional risk to to the point that the risk will catch up to the return. This optimization measured by a ratio, called Sharpe Ratio, will be described in this chapter and more detailed in the following chapters that describe the Portfolio Analysis.

Let's assume that we examined a given stock portfolio and determined the different holding period returns achieved during different economic cycles including recession, boom and normal years. Figure 1.3 below shows that during the recession, the stock portfolio showed 12% negative return, during normal years, positive 14% and boom years, positive 28%. Using scenario analysis, the average return is calculated based on the probability expectation. In other words, let's assume we asked 100 analysts what they believe the next year will bring and from our survey, 25 of them said that they expect a recession, 45 of them expect that the economy will stay at a normal stage and the remaining 30 analysts expect that we will have a boom year. We categorize their response as the probability to determine the weighted average return. Figure 1.3 shows that the expected return is calculated to be 11.70%. The variance and standard deviation using these probabilities are calculated at 222.51% or 2.225x and 14.92%, respectively.

Insert Figure 1.3

SCENARIO PERFROMANCE ANALYSIS

Economic Scenario (S)	Probability (p)	Stocks (s) ROR % (r_s)	$p * r_s$ %	Deviation for Exp. Ret. (Dev.)	Square Deviation (SD) Dev^2	$p * SD$
Recession	25.0%	-12.00	-3.00	-23.70	561.69	140.42
Normal	45.0%	14.00	6.30	2.30	5.29	2.38
Boom	30.0%	28.00	8.40	16.30	265.69	79.71
	100.0%		11.70 %		Variance=	222.51
					SD =	14.92 %

Figure 1.3

Let's assume that we also looked at a different portfolio that includes only bonds. Figure 1.4 below shows that the bond portfolio during the same economic periods the historical return during the recession was 14.0%, during normal years, 5% and during boom years, -5.0%. Just eyeballing the differences with the stocks portfolio during this year we can easily see that the returns for the recession and boom years are moving in opposite direction where the stocks are showing positive return, the bonds show negative. We will later discuss that important relationship called correlation. Figure 1.4 shows that the expected average return using the same probability numbers as the equity is 4.25%. The variance and standard deviation is calculated at 67.75% or 0.677x and 8.23%, respectively.

Insert Figure 1.4

SCENARIO PERFROMANCE ANALYSIS

Economic Scenario (S)	Probability (p)	Bonds (b) ROR % (r_b)	$p * r_b$ %	Deviation for Exp. Ret. (Dev.)	Square Deviation (SD) Dev^2	$p * SD$
Recession	25.0%	14.00	3.50	14.00	196.00	49.00
Normal	45.0%	5.00	2.25	5.00	25.00	11.25
Boom	30.0%	-5.00	-1.50	-5.00	25.00	7.50
	100.0%		4.25 %		Variance=	67.75
					SD =	8.23 %

Figure 1.4

Return, Return Expectation and Allocation

Once the return and risk are determined by asset class, the investor can achieve efficiencies and optimization (discussed in the following chapters) by allocating his or her investment across asset classes. Using the example of the stock portfolio that had return and standard deviation of 11.7% and 14.92%, respectively and the bond portfolio that had return and standard deviation of 4.25% and 8.23%, respectively, when combined at different holding levels can achieve efficiency. For argument sake, let's assume that we decided to invest 60% of our money into stock portfolio shown on figure 1.3 and 40% of our money in the bond portfolio shown on figure 1.4. then the combined portfolio consisting of 60% stock and 40% bonds shows an expected combined return, variance and standard deviation of 8.72%, 38.99% or .39x and 6.24%, respectively. As expected, as we moved from the stock portfolio of 100% to a portfolio of 60% stock and 40% bonds, the return is calculated at 8.72% measured as:

$$(Ws \,.\, Rs) + (Wb \,.\, Rb) = (.60)\ (11.70\%) + (.40)\ (4.25\%) = 7.02\% + 1.7\% = 8.72\%$$

The surprising part of this is that the standard deviation of the combined portfolio that is made of 60% stocks and 40% bonds is calculated at 6.24% which is lower that the stand-alone stock or bond portfolios' standard deviation of 14.92% and 8.23%, respectively shown in figure 1.5 below. In other words, moving from an all stock portfolio to partial stock and bonds portfolio, we achieved a greater efficiency. This phenomenon is achieved due to correlation which is basically comparing the direction of the two standard deviations. The negative correlation between the two portfolios (shown in Figure 1.6) causes the combined portfolio to have a lower standard deviation as the positive movement of the stock is offset by the negative movement of the bond resulting to a lower combined variance and standard deviation.

Insert Figure 1.5

PORTFOLIO ANALYSIS (Asset Allocation)

Asset Allocation	Weights (W%)
Stocks (Ws) =	60%
Bonds (Wb) =	40%

(Ws * rs) + (Wb * rb)

Scenario (S)	**Probability (p)**	**ROR % (rs)**	**p * rs %**	**Deviation for Exp. Ret. (Dev.)**	**Square Deviation (SD) Dev^2**	**p * SD**
Recession (Sr)	25.0%	-1.6	-0.40	-10.32	106.50	26.63
Normal (Sn)	45.0%	10.4	4.68	1.68	2.82	1.27
Boom (Sb)	30.0%	14.8	4.44	6.08	36.97	11.09
	100.0%		**8.72 %**		**Variance=**	**38.99**
					SD =	**6.24 %**

Figure 1.5

Of course, we arbitrary picked the 60% stock and 40% bonds that resulted to a more efficient

combined portfolio. If we continue to move the percentages around of bonds and stocks, we can eventually find the highest point of efficiency know efficient frontier. This point is examined in Chapter 2 using the same example at different correlation points. Figure 1.6 below shows that the actual correlation between the stock and bond portfolios given the standard deviations of each of the portfolios.

Insert Figure 1.6

COVARIANCE & CORRELATION

Scenario (S)	Probability (p)	Stocks (Deviation from the mean)	Bonds (Deviation from the mean)	Ds * Db	Covariance [p * (Ds*Db)]
Recession (Sr)	25.0%	-23.70	9.75	-231.08	-57.77
Normal (Sn)	45.0%	2.30	0.75	1.73	0.78
Boom (Sb)	30.0%	16.30	-9.25	-150.78	-45.23
	100.0%			Covariance=	-102.23
				Correlation Coefficient =	-0.97

Figure 1.6

Setting-up the Portfolio of Stocks and Bonds – A Case Study

Assuming an asset management firm raise a new $200 million fund called Zeus Fund I which will be set-up to buy stock and corporate bonds. In this and in next 4 chapters we will be using the Zeus Fund I as a case study apply all the tools that the portfolio analyst needs. We will also assume that the fund is leveraged at 50% - in other words, the $200 million fund is financed by $100 million of a loan and $100 million of newly raised equity. Figure 1.7 below shows the transaction sources and uses of the fund. The loan is structured as a 5-year $100 million with 5% fixed interest rate. At closing (June 1, 20x1), the $200 million fund is used for purchasing $82.6 million of stocks and $96.65 million of bonds. The manager has kept about $20mm or 10% in cash for liquidity earning 1.5% of annual interest income. The balance is used to pay accrued interest on the bonds.

Insert Figure 1.7

ZEUS Fund I

PORTFOLIO OF STOCKS AND BONDS

TOTAL SOURCES & USES (June 1, 20xx)							
SOURCES ($ 000's)	Amount	% Cap	Interest Rate	USES ($ 000's)	Amount	% Cap	Interest Rate
Portfolio Loan	100,000	50.0%	5.00%	Stock Purchase	$ 82,600	409.5%	
Investor's Cash	100,000	50.0%		Bond Purchase	95,650	474.1%	
				Accrued Interest	1,577	7.8%	
				Cash	$ 20,173	100.0%	1.50%
Total Sources	**200,000**	**100.0%**		**Total Uses**	**$ 200,000**	**991.4%**	

Figure 1.7

Figure 1.8 below shows an 7-month cash flow of Zeus Fund I portfolio that includes all the trades, dividends received, coupon payments received, payment to service the loan, accrued interest paid and received due to trades in between coupon dates and interest income from the cash that is deposited at the bank. Latter figures show the details of such activity.

Insert Figure 1.8

ZEUS Fund I

PORTFOLIO OF STOCKS AND BONDS

		ENTRY							EXIT
CASH FLOWS		*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
		June 1	July 1	Aug 1	Sep 1	Oct 1	Nov 1	Dec 1	Jan 2
MONTHLY IRR		20x1	20x1	20x1	20x1	20x1	20x1	20x1	20x2
Beginning Cash		100,000	20,173	23,415	22,396	21,564	21,420	21,932	25,210
Buy/Sell Stock		$ (82,600)	$ -	$ 1,550	$ 2,300	$ -	$ -	$ -	$ 92,600
Buy/Sell Bonds		$ (95,650)	$ 2,875	$ (2,880)	$ (4,075)	$ -	$ 865	$ 3,550	$ 97,000
Stock Dividends			$ 93	$ 90	$ 150	$ 245	$ 63	$ -	$ -
Bond Coupon Received		$ -	$ 875	$ 594	$ 1,344	$ -	$ -	$ -	$ -
Acrued Interest (paid)/Received		$ (1,577)	$ (209)	$ 14	$ (161)	$ -	$ (25)	$ 117	$ 1,927
Loan Principal Increase/Decrease		$ 100,000							$ (100,000)
Loan Interest Payment			$ (417)	$ (417)	$ (417)	$ (417)	$ (417)	$ (417)	$ (417)
Cash Balance Interest Income			$ 25	$ 29	$ 28	$ 27	$ 27	$ 27	$ 27
Cash		$ (20,173)							$ 25,210
Total Cash Flows (Levered)	2.86%	$ (100,000)	$ 3,242	$ (1,019)	$ (831)	$ (145)	$ 513	$ 3,277	$ 116,347
Use of cash		$ 20,173	$ -	$ -	$ -	$ -	$ -	$ -	$ (25,210)
Total Cash Flows		20,173	23,415	22,396	21,564	21,420	21,932	25,210	116,347
% of Cash to total Value		10.2%	11.8%	11.0%	10.4%	10.2%	10.4%	11.7%	

HPR (Levered) = 21.4%

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	June 1	July 1	Aug 1	Sep 1	Oct 1	Nov 1	Dec 1	Jan 2
Unlevered Return Calculation:	20x1	20x1	20x1	20x1	20x1	20x1	20x1	20x2
Total Cash Flows (Levered)	$ (100,000)	$ 3,242	$ (1,019)	$ (831)	$ (145)	$ 513	$ 3,277	$ 116,347
Addback Loan Principal	(100,000)	-	-	-	-	-	-	100,000
Addback Loan Interest	-	417	417	417	417	417	417	417
Unlevered Cash Flow	$ (200,000)	$ 3,658	$ (603)	$ (415)	$ 272	$ 929	$ 3,694	$ 216,764

HPR (UnLevered) = 12.2%

Figure 1.8

From the cash flow trading activity of this portfolio shown on Figure 1.8 above the analyst can calculate the monthly IRR – shown at 2.86%. The other return that was discussed earlier in the chapter is the Holding Period Return (HPR). For the portfolio above, the HPR is a levered HPR because 50% of capital used to finance the portfolio is by debt. The levered HPR which is HPR = $\frac{CF}{I}$ is calculated as follows ($000 s):

$$\frac{(-100{,}000 + 3{,}242 - 1{,}019 - 831 - 145 + 513 + 3{,}277 + 116{,}347)}{100{,}000} = 0.214 = 21.4\%$$

The unlevered HPR is calculated as follows ($000s):

$$\frac{(-200{,}000 + 3{,}658 - 603 - 415 + 272 + 929 + 3{,}694 + 216{,}764)}{100{,}000} = 0.122 = 12.2\%$$

Figures 1.9 below shows the initial purchase of the 10 stocks for $82.6 million and bond of $96.65 million.

Insert Figure 1.9

ZEUS Fund I

STOCK PORTFOLIO

Stock Prices

Symbol	Company Name	Industry	June 1 20x1
ABC	ABC Chem Inc	Chemicals	23.00
BCD	BCD Precision Inc	Industrial	12.00
CDE	CDE Inc	Publishing	18.00
DEF	DEF Inc	Hospitality	40.00
EFG	Effective Inc	TV/Cable	52.00
FGH	FGH Inc	Techonlogy	31.00
GHI	General HI	Service	15.00
HIK	Hicks Kental Inc	Retail	8.00
IKL	IKL Inc	Pharmaceutical	15.00
KLM	KLM Health	Healthcare	25.00

Number of Shares own (000's)

Symbol	Company Name	Industry	June 1 20x1
ABC	ABC Chem Inc	Chemicals	400
BCD	BCD Precision Inc	Industrial	350
CDE	CDE Inc	Publishing	300
DEF	DEF Inc	Hospitality	300
EFG	Effective Inc	TV/Cable	200
FGH	FGH Inc	Techonlogy	400
GHI	General HI	Service	600
HIK	Hicks Kental Inc	Retail	1000
IKL	IKL Inc	Pharmaceutical	300
KLM	KLM Health	Healthcare	300

Total Stock Value ($000's)

Symbol	Company Name	Industry	June 1 20x1
ABC	ABC Chem Inc	Chemicals	9,200
BCD	BCD Precision Inc	Industrial	4,200
CDE	CDE Inc	Publishing	5,400
DEF	DEF Inc	Hospitality	12,000
EFG	Effective Inc	TV/Cable	10,400
FGH	FGH Inc	Techonlogy	12,400
GHI	General HI	Service	9,000
HIK	Hicks Kental Inc	Retail	8,000
IKL	IKL Inc	Pharmaceutical	4,500
KLM	KLM Health	Healthcare	7,500
Total Value			82,600

BOND PORTFOLIO

Bond Prices

Symbol	Company Name	Industry	June 1 20x1
AAA	Alpha Inc.	Healthcare	890.00
BBB	Beta Inc.	Retail	910.00
CCC	CC Corporation	Industrial	790.00
DDD	Delta D Inc.	Hospitality	1010.00

Bonds Own (000's)

Symbol	Company Name	Industry	June 1 20x1
AAA	Alpha Inc.	Healthcare	15
BBB	Beta Inc.	Retail	20
CCC	CC Corporation	Industrial	30
DDD	Delta D Inc.	Hospitality	40

Total Bond Value ($000's)

Symbol	Company Name	Industry	June 1 20x1
AAA	Alpha Inc.	Healthcare	13,350
BBB	Beta Inc.	Retail	18,200
CCC	CC Corporation	Industrial	23,700
DDD	Delta D Inc.	Hospitality	40,400
Total Value			95,650

Figure 1.9

Figure 1.10 below shows information of the bonds including 2 more that the manager is looking to buy in the future. The bond information includes the maturity date, the external corporate ratings, the coupon dates and payments.

Insert Figure 1.10

ZEUS Fund I

BOND PORTFOLIO

BOND INFORMATION

Symbol	Company	Industry	Face Value	Maturity Date	S&P Rating	Moody's Rating	Coupon Rate	First Coupon Payment	Second Coupon Payment	Annual Coupon Payment
AAA	Alpha Inc.	Healthcare	1000	15-Aug-23	BB-	Ba2	5.2500%	15-Feb-17	15-Aug-17	52.50
BBB	Beta Inc.	Retail	1000	1-Jul-20	BB+	Ba1	4.5000%	1-Jan-17	1-Jul-17	45.00
CCC	CC Corpor	Industrial	1000	15-Sep-25	B	B2	7.0000%	15-Mar-17	15-Sep-17	70.00
DDD	Delta D Inc	Hospitality	1000	15-Jul-19	BBB	Baa2	3.5000%	15-Jan-17	15-Jul-17	35.00
EEE	Epsilon Inc	Technology	1000	1-Oct-26	BB	Ba3	4.7500%	1-Apr-17	1-Oct-17	47.50
FFF	Fusbol For	Retail	1000	15-Aug-26	CCC+	Caa1	8.0000%	15-Feb-17	15-Aug-17	80.00

Figure 1.10

Figures 1.11 and 1.11 below shows the value of the stock portfolio that includes all the trades during the hold period, as well as all the dividends received during this period. For argument sake, let's assume the manager sets-up only an 7-month trading portfolio and in order to realize return so it liquidates the entire portfolio 7 months after the initial investment (Jan 2, 20x2).

Insert Figure 1.11

ZEUS Fund I

STOCK PORTFOLIO

Stock Prices

			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
ABC	ABC Chem Inc	Chemicals	23.00	24.00	22.50	25.00	26.00	27.00	28.00	31.00
BCD	BCD Precision Inc	Industrial	12.00	10.00	12.00	12.00	15.00	18.00	19.50	22.00
CDE	CDE Inc	Publishing	18.00	19.00	18.00	19.00	21.00	20.00	19.00	21.00
DEF	DEF Inc	Hospitality	40.00	42.00	43.00	45.00	45.00	45.00	46.00	48.00
EFG	Effective Inc	TV/Cable	52.00	60.00	60.00	60.00	62.00	62.00	61.00	63.00
FGH	FGH Inc	Techonlogy	31.00	20.00	25.00	26.00	20.00	22.00	24.00	25.00
GHI	General HI	Service	15.00	16.00	17.00	18.00	19.00	19.00	18.00	20.00
HIK	Hicks Kental Inc	Retail	8.00	9.50	10.50	11.00	11.50	12.00	14.00	14.50
IKL	IKL Inc	Pharmaceutical	15.00	13.00	12.00	14.00	15.00	18.00	22.00	20.00
KLM	KLM Health	Healthcare	25.00	26.00	26.00	26.00	26.00	26.00	27.00	20.00
LMN	LMN Hotel & Resorts	Hospitality		30.00	32.00	33.00	35.00	32.00	34.00	35.00
MNO	MNO Cable Inc	TV/Cable		20.00	19.00	18.00	18.00	16.00	20.00	18.00
NOP	Norton Optimum	Techonlogy		52.00	55.00	56.00	58.00	59.00	59.00	61.00
OPQ	Odyssea PQ Inc	Retail			11.00	11.00	11.00	11.00	11.50	12.00
PQR	PQR Chemicals	Chemicals					20.00	22.00	26.00	24.00

Number of Shares own (000's)

			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
ABC	ABC Chem Inc	Chemicals	400	400	100	100	100	100	100	0
BCD	BCD Precision Inc	Industrial	350	350	50	50	50	50	50	0
CDE	CDE Inc	Publishing	300	300	200	200	200	200	200	0
DEF	DEF Inc	Hospitality	300	300	300	200	200	200	200	0
EFG	Effective Inc	TV/Cable	200	200	200	200	200	200	200	0
FGH	FGH Inc	Techonlogy	400	400	400	400	100	100	100	0
GHI	General HI	Service	600	600	600	600	600	600	600	0
HIK	Hicks Kental Inc	Retail	1000	1000	1000	1000	1000	1000	1000	0
IKL	IKL Inc	Pharmaceutical	300	300	300	300	300	300	300	0
KLM	KLM Health	Healthcare	300	300	300	300	300	300	300	0
LMN	LMN Hotel & Resorts	Hospitality		0	100	100	100	100	100	0
MNO	MNO Cable Inc	TV/Cable		0	100	100	100	100	100	0
NOP	Norton Optimum	Techonlogy		0	100	100	100	100	100	0
OPQ	Odyssea PQ Inc	Retail		0	0	200	200	200	200	0
PQR	PQR Chemicals	Chemicals		0	0	0	300	300	300	0

Buy/Sell Stock (000's)

			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
ABC	ABC Chem Inc	Chemicals			-300					-100
BCD	BCD Precision Inc	Industrial			-300					-50
CDE	CDE Inc	Publishing			-100					-200
DEF	DEF Inc	Hospitality				-100				-200
EFG	Effective Inc	TV/Cable								-200
FGH	FGH Inc	Techonlogy					-300			-100
GHI	General HI	Service								-600
HIK	Hicks Kental Inc	Retail								-1000
IKL	IKL Inc	Pharmaceutical								-300
KLM	KLM Health	Healthcare								-300
LMN	LMN Hotel & Resorts	Hospitality			100					-100
MNO	MNO Cable Inc	TV/Cable			100					-100
NOP	Norton Optimum	Techonlogy			100					-100
OPQ	Odyssea PQ Inc	Retail				200				-200
PQR	PQR Chemicals	Chemicals					300			-300

Buy/Sell ($000's)

			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
ABC	ABC Chem Inc	Chemicals	0	0	6,750	0	0	0	0	3,100
BCD	BCD Precision Inc	Industrial	0	0	3,600	0	0	0	0	1,100
CDE	CDE Inc	Publishing	0	0	1,800	0	0	0	0	4,200
DEF	DEF Inc	Hospitality	0	0	0	4,500	0	0	0	9,600
EFG	Effective Inc	TV/Cable	0	0	0	0	0	0	0	12,600
FGH	FGH Inc	Techonlogy	0	0	0	0	6,000	0	0	2,500
GHI	General HI	Service	0	0	0	0	0	0	0	12,000
HIK	Hicks Kental Inc	Retail	0	0	0	0	0	0	0	14,500
IKL	IKL Inc	Pharmaceutical	0	0	0	0	0	0	0	6,000
KLM	KLM Health	Healthcare	0	0	0	0	0	0	0	6,000
LMN	LMN Hotel & Resorts	Hospitality	0	0	(3,200)	0	0	0	0	3,500
MNO	MNO Cable Inc	TV/Cable	0	0	(1,900)	0	0	0	0	1,800
NOP	Norton Optimum	Techonlogy	0	0	(5,500)	0	0	0	0	6,100
OPQ	Odyssea PQ Inc	Retail	0	0	0	(2,200)	0	0	0	2,400
PQR	PQR Chemicals	Chemicals	0	0	0	0	(6,000)	0	0	7,200
Total Sale/Purchases Cash Flow			**0**	**0**	**1,550**	**2,300**	**0**	**0**	**0**	**92,600**

Total Value ($000's)

			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
ABC	ABC Chem Inc	Chemicals	9,200	9,600	2,250	2,500	2,600	2,700	2,800	0
BCD	BCD Precision Inc	Industrial	4,200	3,500	600	600	750	900	975	0
CDE	CDE Inc	Publishing	5,400	5,700	3,600	3,800	4,200	4,000	3,800	0
DEF	DEF Inc	Hospitality	12,000	12,600	12,900	9,000	9,000	9,000	9,200	0
EFG	Effective Inc	TV/Cable	10,400	12,000	12,000	12,000	12,400	12,400	12,200	0
FGH	FGH Inc	Techonlogy	12,400	8,000	10,000	10,400	2,000	2,200	2,400	0
GHI	General HI	Service	9,000	9,600	10,200	10,800	11,400	11,400	10,800	0
HIK	Hicks Kental Inc	Retail	8,000	9,500	10,500	11,000	11,500	12,000	14,000	0
IKL	IKL Inc	Pharmaceutical	4,500	3,900	3,600	4,200	4,500	5,400	6,600	0
KLM	KLM Health	Healthcare	7,500	7,800	7,800	7,800	7,800	7,800	8,100	0
LMN	LMN Hotel & Resorts	Hospitality	0	0	3,200	3,300	3,500	3,200	3,400	0
MNO	MNO Cable Inc	TV/Cable	0	0	1,900	1,800	1,800	1,600	2,000	0
NOP	Norton Optimum	Techonlogy	0	0	5,500	5,600	5,800	5,900	5,900	0
OPQ	Odyssea PQ Inc	Retail	0	0	0	2,200	2,200	2,200	2,300	0
PQR	PQR Chemicals	Chemicals	0	0	0	0	6,000	6,600	7,800	0
Total Value			**82,600**	**82,200**	**84,050**	**85,000**	**85,450**	**87,300**	**92,275**	**0**

Figure 1.11

Insert Figure 1.12

ZEUS Fund I

STOCK PORTFOLIO

Dividends			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
ABC	ABC Chem Inc	Chemicals		$ 0.10				$ 0.10		
BCD	BCD Precision Inc	Industrial		$ 0.15				$ 0.15		
CDE	CDE Inc	Publishing								
DEF	DEF Inc	Hospitality			$ 0.30					
EFG	Effective Inc	TV/Cable				$ 0.30				
FGH	FGH Inc	Techonlogy								
GHI	General HI	Service				$ 0.15				
HIK	Hicks Kental Inc	Retail					$ 0.20			
IKL	IKL Inc	Pharmaceutical					$ 0.15			
KLM	KLM Health	Healthcare						$ 0.15		
LMN	LMN Hotel & Resorts	Hospitality								
MNO	MNO Cable Inc	TV/Cable								
NOP	Norton Optimum	Techonlogy								
OPQ	Odyssea PQ Inc	Retail								
PQR	PQR Chemicals	Chemicals								

Dividends ($ 000's)			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
ABC	ABC Chem Inc	Chemicals		40	0	0	0	10	0	0
BCD	BCD Precision Inc	Industrial		53	0	0	0	8	0	0
CDE	CDE Inc	Publishing		0	0	0	0	0	0	0
DEF	DEF Inc	Hospitality		0	90	0	0	0	0	0
EFG	Effective Inc	TV/Cable		0	0	60	0	0	0	0
FGH	FGH Inc	Techonlogy		0	0	0	0	0	0	0
GHI	General HI	Service		0	0	90	0	0	0	0
HIK	Hicks Kental Inc	Retail		0	0	0	200	0	0	0
IKL	IKL Inc	Pharmaceutical		0	0	0	45	0	0	0
KLM	KLM Health	Healthcare		0	0	0	0	45	0	0
LMN	LMN Hotel & Resorts	Hospitality		0	0	0	0	0	0	0
MNO	MNO Cable Inc	TV/Cable		0	0	0	0	0	0	0
NOP	Norton Optimum	Techonlogy		0	0	0	0	0	0	0
OPQ	Odyssea PQ Inc	Retail		0	0	0	0	0	0	0
PQR	PQR Chemicals	Chemicals		0	0	0	0	0	0	0
		Total Dividends		93	90	150	245	63	0	0

Figure 1.12

Figures 1.13 and 1.14 below shows the value of the bond portfolio that includes all the trades during the hold period including paid accrued interest, as well as all the coupon payment received during this period. For argument sake, let's assume the manager sets-up only an 7-month trading portfolio and in order to realize return so it liquidates the entire portfolio 7 months after the initial investment (Jan 2, 20x2).

Insert Figure 1.13

ZEUS Fund I

BOND PORTFOLIO

Bond Prices

			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
AAA	Alpha Inc.	Healthcare	890	893	895	905	910	912	915	910
BBB	Beta Inc.	Retail	910	925	915	925	915	922	935	930
CCC	CC Corporation	Industrial	790	800	810	815	820	822	815	800
DDD	Delta D Inc.	Hospitality	1010	1015	1020	1022	1026	1025	1020	1027
EEE	Epsilon Inc	Technology	950	965	975	980	982	995	1000	1010
FFF	Fusbol For Friends	Retail	640	680	687	695	710	720	710	700
			5190	5278	5302	5342	5363	5396	5395	5377

Bonds Own

			0	1	2	3	4	5	6	7
Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
AAA	Alpha Inc.	Healthcare	15	15	15	15	15	15	15	0
BBB	Beta Inc.	Retail	20	8	0	0	0	0	0	0
CCC	CC Corporation	Industrial	30	30	30	35	35	40	40	0
DDD	Delta D Inc.	Hospitality	40	40	50	50	50	50	50	0
EEE	Epsilon Inc	Technology	0	5	5	5	5	0	0	0
FFF	Fusbol For Friends	Retail	0	5	5	5	5	5	0	0

Buy/Sell

Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
AAA	Alpha Inc.	Healthcare	15							-15
BBB	Beta Inc.	Retail	20	-12	-8					0
CCC	CC Corporation	Industrial	30			5		5		-40
DDD	Delta D Inc.	Hospitality	40		10					-50
EEE	Epsilon Inc	Technology	0	5				-5		0
FFF	Fusbol For Friends	Retail	0	5					-5	0

Buy/Sell

Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
AAA	Alpha Inc.	Healthcare		-	-	-	-	-	-	13,650
BBB	Beta Inc.	Retail		11,100	7,320	-	-	-	-	-
CCC	CC Corporation	Industrial		-	-	(4,075)	-	(4,110)	-	32,000
DDD	Delta D Inc.	Hospitality		-	(10,200)	-	-	-	-	51,350
EEE	Epsilon Inc	Technology		(4,825)	-	-	-	4,975	-	-
FFF	Fusbol For Friends	Retail		(3,400)	-	-	-	-	3,550	-
Total Buy/Sale Proceeds			-	2,875	(2,880)	(4,075)	-	865	3,550	97,000

Value of Bonds

Symbol	Company Name	Industry	June 1 20x1	July 1 20x1	Aug 1 20x1	Sep 1 20x1	Oct 1 20x1	Nov 1 20x1	Dec 1 20x1	Jan 2 20x2
AAA	Alpha Inc.	Healthcare	13,350	13,395	13,425	13,575	13,650	13,680	13,725	-
BBB	Beta Inc.	Retail	18,200	7,400	-	-	-	-	-	-
CCC	CC Corporation	Industrial	23,700	24,000	24,300	28,525	28,700	32,880	32,600	-
DDD	Delta D Inc.	Hospitality	40,400	40,600	51,000	51,100	51,300	51,250	51,000	-
EEE	Epsilon Inc	Technology	-	4,825	4,875	4,900	4,910	-	-	-
FFF	Fusbol For Friends	Retail	-	3,400	3,435	3,475	3,550	3,600	-	-
Total Value			95,650	93,620	97,035	101,575	102,110	101,410	97,325	-

Figure 1.13

Figure 1.14 below also includes current yield and duration calculation – discussed in more detail in latter chapters.

Insert Figure 1.14

ZEUS Fund I

BOND PORTFOLIO

Coupon Payment

Symbol	Coupon Dates		1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19	WA 9/17
AAA	15-Feb-17	15-Aug-17				26.25					3.508
BBB	1-Jan-17	1-Jul-17			22.50						0.000
CCC	15-Mar-17	15-Sep-17					35.00				9.829
DDD	15-Jan-17	15-Jul-17			17.50						8.804
EEE	1-Apr-17	1-Oct-17					23.75				1.146
FFF	15-Feb-17	15-Aug-17				40.00					1.368
			0.00	0.00	40.00	66.25	58.75	0.00	0.00	0.00	**24.655**
										Annual	49.310

Coupon Payment			*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Symbol	Coupon Dates		1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19
AAA	15-Feb-17	15-Aug-17		$ -	$ -	$ 393.75	$ -	$ -	$ -	$ -
BBB	1-Jan-17	1-Jul-17		$ -	$ -	$ -	$ -	$ -	$ -	$ -
CCC	15-Mar-17	15-Sep-17		$ -	$ -	$ -	$ 1,225.00	$ -	$ -	$ -
DDD	15-Jan-17	15-Jul-17		$ -	$ 875.00	$ -	$ -	$ -	$ -	$ -
EEE	1-Apr-17	1-Oct-17		$ -	$ -	$ -	$ 118.75	$ -	$ -	$ -
FFF	15-Feb-17	15-Aug-17			$ -	$ 200.00	$ -	$ -	$ -	$ -
Total Value				$ -	$ 875.00	$ 593.75	$ 1,343.75	$ -	$ -	$ -

Days Since Coupon Paid

Symbol	Coupon Dates		1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19
AAA	15-Feb-17	15-Aug-17	105	135	165	15	45	75	105	135
BBB	1-Jan-17	1-Jul-17	150	0	30	60	90	120	150	0
CCC	15-Mar-17	15-Sep-17	76	106	136	166	16	46	76	106
DDD	15-Jan-17	15-Jul-17	136	166	16	46	76	106	136	166
EEE	1-Apr-17	1-Oct-17	60	90	120	150	0	30	60	90
FFF	15-Feb-17	15-Aug-17	105	135	165	15	45	75	105	135

Acrued Interest calculated

Symbol	Coupon Dates		1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19
AAA	15-Feb-17	15-Aug-17	-15.31	-19.69	-24.06	-2.19	-6.56	-10.94	-15.31	-19.69
BBB	1-Jan-17	1-Jul-17	-18.75	0.00	-3.75	-7.50	-11.25	-15.00	-18.75	0.00
CCC	15-Mar-17	15-Sep-17	-14.78	-20.61	-26.44	-32.28	-3.11	-8.94	-14.78	-20.61
DDD	15-Jan-17	15-Jul-17	-13.22	-16.14	-1.56	-4.47	-7.39	-10.31	-13.22	-16.14
EEE	1-Apr-17	1-Oct-17	-7.92	-11.88	-15.83	-19.79	0.00	-3.96	-7.92	-11.88
FFF	15-Feb-17	15-Aug-17	-23.33	-30.00	-36.67	-3.33	-10.00	-16.67	-23.33	-30.00

Acrued Interest

Symbol	Coupon Dates		1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19
AAA	15-Feb-17	15-Aug-17	(229.69)	-	-	-	-	-	-	295.31
BBB	1-Jan-17	1-Jul-17	(375.00)	-	30.00	-	-	-	-	-
CCC	15-Mar-17	15-Sep-17	(443.33)	-	-	(161.39)	-	(44.72)	-	824.44
DDD	15-Jan-17	15-Jul-17	(528.89)	-	(15.56)	-	-	-	-	806.94
EEE	1-Apr-17	1-Oct-17	-	(59.38)	-	-	-	19.79	-	-
FFF	15-Feb-17	15-Aug-17	-	(150.00)	-	-	-	-	116.67	-
Total Accrued Interest			(1,576.91)	(209.38)	14.44	(161.39)	-	(24.93)	116.67	1,926.70

Current Yields

Symbol	Annual Payments	1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19
AAA	$ 52.50	5.899%	5.879%	5.866%	5.801%	5.769%	5.757%	5.738%	5.769%
BBB	$ 45.00	4.945%	4.865%	4.918%	4.865%	4.918%	4.881%	4.813%	4.839%
CCC	$ 70.00	8.861%	8.750%	8.642%	8.589%	8.537%	8.516%	8.589%	8.750%
DDD	$ 35.00	3.465%	3.448%	3.431%	3.425%	3.411%	3.415%	3.431%	3.408%
EEE	$ 47.50	5.000%	4.922%	4.872%	4.847%	4.837%	4.774%	4.750%	4.703%
FFF	$ 80.00	12.500%	11.765%	11.645%	11.511%	11.268%	11.111%	11.268%	11.429%

Remaining Years to Maturity

Symbol	Maturity	1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19
AAA	8/15/2023	5.21	5.13	5.04	4.96	4.87	4.79	4.71	4.62
BBB	7/1/2020	2.08	2.00	1.92	1.83	1.75	1.67	1.58	1.50
CCC	9/15/2025	7.30	7.21	7.13	7.04	6.96	6.88	6.79	6.71
DDD	7/15/2019	1.12	1.04	0.95	0.87	0.79	0.70	0.62	0.53
EEE	10/1/2026	8.34	8.26	8.17	8.09	8.01	7.92	7.84	7.75
FFF	8/15/2026	8.21	8.13	8.04	7.96	7.88	7.79	7.71	7.62

Duration

Symbol		1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19	WA Duration 9/17
AAA	8/15/2023	4.54	4.46	4.38	4.41	4.33	4.24	4.16	4.08	0.54
BBB	7/1/2020	1.98	1.93	1.85	1.77	1.68	1.60	1.52	1.47	0.00
CCC	9/15/2025	5.65	5.57	5.50	5.42	5.54	5.46	5.37	5.28	1.48
DDD	7/15/2019	1.10	1.01	0.95	0.86	0.78	0.70	0.61	0.53	0.27
EEE	10/1/2026	6.91	6.83	6.75	6.67	6.74	6.66	6.58	6.50	0.31
FFF	8/15/2026	5.68	5.66	5.58	5.78	5.71	5.64	5.55	5.45	0.19
										2.79

Figure 1.14

Further analysis on Zeus Fund I portfolio will be shown in following chapters on this unit including, the standard deviation, Beta Coefficient Regression analysis calculations, Sharpe Ratio, Jensen's Alpha, M Square and Treynor Measures. The following chapters will also show how to achieve efficiency and optimization by trading out of stocks into bonds due to correlation as discussed earlier in this chapter.

CASE STUDY AND PRACTICE CASES

1. Based on the information below, complete the projected spreadsheet. (access spreadsheet www.professordrou.com)

   TO BE PROVIDED LATER

References (Chapter 1)

TO BE PROVIDED LATER