

Bemus Investment Management (BIM)

Bemus Investment Management has landed yet another client, Lorenzo Partners, one of the largest architectural and engineering design firms in upstate New York. You have been assigned to take over management of a portfolio of equities, part of this firm's pension plan. The current composition of this portfolio is given in Exhibit 1.

This is a *defined contribution* plan: the company contributes to the plan on behalf of its employees.¹ Each employee "owns" part of the fund. The employee's balance grows as additional contributions are made and investment returns accumulate.² The employees' final balance at retirement is used to fund his or her retirement income. For example, the balance might be used to purchase an annuity guaranteeing a stable monthly income for the rest of the retired employee's life.

Exhibit 2 shows the distribution of normal (age 65) retirement dates for the current participants in the equity portfolio.³ The uneven distribution of retirement dates results from fluctuations in Lorenzo Partners' past growth and hiring, and from random variations in the age of employees when they were hired. Note, however, that the majority of employees will retire after 2021. The total number of employees is 156 and the average current balance per employee is about \$144,000.

Your client is Gustav Herkimer, Lorenzo Partners' CFO. He exhorts you to "invest for the long run," but also asks for quarterly reports tracking portfolio performance relative to the Standard and Poors 500 Index (S&P 500). Mr. Herkimer also asks for a brief report summarizing BIM's investment strategy and the initial composition of the equity portfolio. Please submit this report by Tuesday, November 25. Attach a

¹ The employees can contribute additional amounts by deductions from their paychecks.

² Investment returns on defined-contribution pension portfolios are not taxed until withdrawn by the employee.

³ Lorenzo Partners also has a fixed-income portfolio available for its employees, but that portfolio is not managed by BIM.

printout of your starting portfolio (securities chosen and amount invested in each) to your report.

You are free to sell any of the securities in Lorenzo Partners' existing portfolio. You should construct a new portfolio from the "universe" of securities listed in Exhibit 3. Instructions for obtaining price quotes and other information on these securities are attached to this assignment. The attachments also include suggestions for proper use of portfolio optimization models. Please read these suggestions carefully.

The securities you select will be purchased at closing (asked) market prices on Friday, December 2, 2003. A description of trading procedures and constraints is attached to this assignment.

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Exhibit 1

*Lorenzo Partners Pension Fund
Equity Portfolio on November 5, 2003*

Cash (invested at 3-month T-bill rate) \$ 3,800,000

<u>Common Stock</u>	<u>Shares</u>	<u>Price</u>	<u>Market Value</u>
BP Prudhoe Bay Royalty Trust (BPT)	5000	\$ 21.24	\$ 106,200
Citigroup (C)	10000	\$ 48.04	\$ 480,400
Ford Motor Co. (F)	50000	\$ 12.22	\$ 611,000
Hewlett Packard (HPQ)	20000	\$ 22.70	\$ 454,000
Lucent Technologies (LU)	15000	\$ 3.27	\$ 49,050
Microsoft (MSFT)	60000	\$ 26.68	\$ 1,600,800
Plum Creek Timber (PCL)	5000	\$ 26.64	\$ 133,200
AT&T (T)	20000	\$ 18.87	\$ 377,400
Time Warner Inc. (TWX)	30000	\$ 15.64	\$ 469,200

<u>Mutual Fund</u>	<u>Shares</u>	<u>Price</u>	<u>Market Value</u>
Vanguard 500 Index Fund (VFINX)	150000	\$ 97.95	\$ 14,815,800

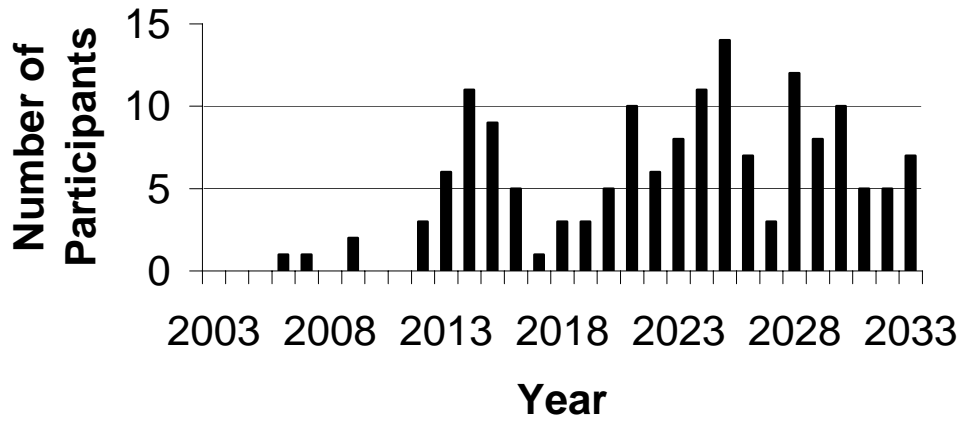
TOTAL VALUE \$ 22,773,750

Exhibit 2

Lorenzo Partners Pension Fund
Normal Retirement Dates of Current Participants

<u>Year</u>	<u># Retiring</u>
2003	0
2004	0
2005	0
2006	1
2007	1
2008	0
2009	2
2010	0
2011	0
2012	3
2013	6
2014	11
2015	9
2016	5
2017	1
2018	3
2019	3
2020	5
2021	10
2022	6
2023	8
2024	11
2025	14
2026	7
2027	3
2028	12
2029	8
2030	10
2031	5
2032	5
2033	7
Total:	156

Normal Retirement Dates of Current Participants



*Lorenzo Partners Pension Fund
Available Equity Investments*

Money Market Rate

3-month T-Bill rate

Stocks (Ticker)

Amazon (AMZN)
BP Prudhoe Bay Royalty Trust (BPT)
Citigroup (C)
Computer Associates (CA)
ChevronTexaco Corp. (CVX)
Consolidated Edison (ED)
Eastman Chemical (EMN)
Fleet Boston Financial (FBF)
Ford Motor Co. (F)
Freeport McMoran Copper and Gold (FCX)
Hewlett Packard (HPQ)
International Business Machines (IBM)
JP Morgan Chase (JPM)
Lucent Technologies (LU)
Macrochem Corp (MCHM)
McKesson HBOC (MCK)
Merck & Co. (MRK)
Merrill Lynch (MER)
Microsoft (MSFT)
PG & E Corp. (PCG)
Plum Creek (PCL)
AT&T (T)
Thermo Electron (TMO)
Time Warner Inc. (TXW)
Biotech HLDRS (BBH)*
Nasdaq 100 (QQQ)*

Mutual Funds

Vanguard 500 Index Fund (VFINX)
Vanguard Mid-Cap Index Fund (VMCIX)
Vanguard Small-Cap Index Fund (VSCIX)

**Exchange Traded Portfolio*

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Background and Procedures

Purpose of Assignment

1. Common stocks: Price quotations and markets; interpreting dividend yields, growth rates and price earnings ratios; information provided by security analysts.
2. Efficient market and random walk hypotheses.
3. Measures of volatility and correlation.
4. Efficient portfolio diversification.
5. Betas and expected returns; CAPM and APT models.

Preparing the assignment

This is a group assignment. You should maintain the same group used in the first trading game project.

Enter your portfolio trades (sales/purchases) electronically, on the 15.407 website, before 4 p.m. on December 5. Your trades will be executed at closing prices on December 5. Trades submitted after the 4 p.m. deadline will not be executed.

Submit your group's report, with a printout of your portfolio, by 5 p.m. on December 2.

Trading constraints

1. No short sales allowed.
2. No leverage allowed. If you try to buy more than your portfolio's market value, your group will be penalized 10% per month on the excess.
3. Any "cash" not invested in other securities will be automatically invested at the 3-month Treasury bill rate of return.
4. Sales and purchases must be in round lots (multiples of 100 shares).

Suggestions for portfolio optimization

You may decide to compute mean-variance efficient portfolios. If so, take extreme care to use reasonable expected returns. (GIGO = Garbage Inputs, Garbage Outputs.)

First establish base-case returns using the CAPM, with a reasonable market risk premium. Use betas calculated from the same past rates of return used to calculate variances and co-variances. Use a current risk-free rate. Calculate efficient portfolios. Make sure to include the market portfolio e.g., the Index 500 mutual fund, as one possible investment. Which portfolio has the highest Sharpe ratio?

Then consider whether to change the base-case expected returns, based on your analyses of the securities in your “universe” of potential investments.

Getting price quotes, price histories and security analysis reports

1. Current price quotes and price histories:

You can use the return data in PriceDatafile.xls posted on the 15.407 website.

The current price quotes and price histories for all the stocks and funds are also available online, from Yahoo! Finance. You will need to enter the security symbol listed in Exhibit 3 to get the information you want.

To get the current price quotes for the 3-month Treasury bill, follow the same procedures as in Bemus Investment Management (Fixed Income Case).

2. Security analysis reports:

For each of the stocks, a security analysis report can be obtained from the Factiva.

To get a security analysis report:

Go to the Factiva website following from the course resource page.

Once in Factiva, click on "Company/Markets" in the top menu bar.

Enter the ticker symbol or company name to get to the company page.

You now have access to a full array of the company information.

Yahoo! Finance also provides sufficient information about the companies.