Old-fashioned financial assets

Topical: One of the reasons your teacher stays away from emerging markets ... (an atypical reaction)
General Funds Families

- **Equity** (stocks)
- **Yield-bearing Financial Assets (YBFA)**
  - U.S. Treasury
  - Corporate and other bond and note
- **Money Market**
  - YBFAs with maturities of less than one year
- **Hybrid**
  - A mix of the above
- **Target Retirement** (i.e. Target Retirement 2050)
  - I don't like these, high churn rate

... from Chapter 5, which will provide most of your guidance about mutual funds.
General Equity Mutual Fund Categories

- **Income**
  - conservative; stresses dividends and established companies
- **Growth**
  - riskier; target high cap gains, fast growth companies
- **Index**
  - pegged to an index like the S&P 500
- **Specialty**
  - small cap, sector, industry, etc.
- **Mixed/Hybrid**

Primary Benefits of Mutual Funds: **Diversification**

Note: See the other benefits in chapter 5 – here I amplify on the mathematical explanation of diversification, and introduce a related concept, correlation.

From Econ 136:

and from our assumptions made in that class, the square root of the variance of the sums is less than the square root of the sum of the variances.

2-asset Portfolio Variance Sums

Variance is purely additive if two variables are strictly independent:

\[ V(x + y) = V(x) + V(y) + 2COV(x, y) \]

remembering that Covariance is equal to the Correlation Coefficient (0 if no perfectly independent, 1 if perfectly correlated, -1 if perfectly polar) times the product of the standard deviations:

\[ COV(x, y) = \text{CORREL}(x, y) \times SD(x) \times SD(y) \]

Volatility is equal to the square root of variance.
Simple example of diversification using our formula:

Suppose you have two uncorrelated stocks, \( X(\mu, \sigma) \), \( X_1(0.02, 0.03) \) and \( X_2(0.04, 0.05) \). If you are risk-averse, you may want to put all of your money in stock \( X_2 \) and accept the lower 2\% yield. But what if you split your portfolio 50\%/50\%, giving you a 3\% yield? What would your risk be??

\[ V_1 = 0.0009 \text{ and } V_2 = 0.0025 \text{ and each alpha equals } 1/2. \text{ Therefore} \]
\[ V_{1,2} = 0.25 \times (0.0009 + 0.0025) = 0.00085 \text{ and } 0.00085^{1/2} = 0.0291. \]

Therefore, by diversifying your portfolio you have raised your yield by 50\% while lowering your risk.

Coding the Covariance (prior 2 equations)

For the covariance part of the equation only,

for \( i = 1 \text{ to } (n-1) \) do
for \( j = (i+1) \text{ to } n \) do
\[ \text{COV}(i,j) = \text{CORREL}(i,j) \times \text{SD}(i) \times \text{SD}(j); \]
\[ \text{SUMCOV} = \text{SUMCOV} + \text{COV}(i,j); \]
end;
end;
\[ \text{SUMCOV} = 2 \times \text{SUMCOV}; \]
and the weighted portfolio calculation would be the same except
\[ \text{WCOV}(i,j) = \alpha(i) \times \alpha(j) \times \text{CORREL}(i,j) \times \text{SD}(i) \times \text{SD}(j); \]

Memo slide for sticklers for accuracy (a desirable trait), those of you who want to work in finance, and you coders who own a laptop and want to retire before age 35 trading off of any beach with a wireless setup.
Mutual Fund Fees

<table>
<thead>
<tr>
<th>Fee</th>
<th>For What?</th>
<th>Acceptable Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expense ratio</td>
<td>Summary of all expenses except loads</td>
<td>Below 1% (see handout)</td>
</tr>
<tr>
<td>Loads</td>
<td>Sales commission charge</td>
<td>0 - none</td>
</tr>
<tr>
<td>CDSC and other deferred</td>
<td>To rip you off</td>
<td>0 - none</td>
</tr>
<tr>
<td>Management fee</td>
<td>To manage the fund</td>
<td>Same as expense ratio</td>
</tr>
<tr>
<td>12b-1</td>
<td>Advertising fee</td>
<td>0 - none</td>
</tr>
</tbody>
</table>

See Chapter 5 Figure 5 Acceptable Mutual Fund Fees

Hidden churn fees

*Wall Street Journal* article “The Hidden Costs of Mutual Funds” March 1, 2010, points out that high-churn (high turnover) managed funds, some with 100% turnover, generate excessive hidden fees not shown in expenses because of trading costs:

1. Brokerage commissions
2. Bid/Ask spreads
3. Market-impact costs

The latter reflect that large-scale transactions (such as large purchases) which, as we know, potentially involves dark pools and ISOs, sometimes impact the market adverse to the purchase.

Some analysts estimate this hidden cost to be as high as 3% for some funds.

That’s why I don’t like high turnover funds and why I specifically don’t like Target Retirement Funds! The “turnover ratio” is in the prospectus.
Why your teacher strongly favors S&P500 Index Funds and other conservative index funds

- Extremely diversified – as goes the market, so goes your fund.
- Typically outperforms 85% to 90% of all other mutual funds.
- Extremely low fees and expense ratios – typically around 0.5%
- Absolutely no churning – and therefore no interim tax liability! Low turnover ratio (below 10%).
- Available from all reputable low-fee funds families and often available in 401-K plans.

The General Popularity of the S&P500 Index Funds

My favorite, where I invest for myself and others:

<table>
<thead>
<tr>
<th>Vanguard 500 Index Fund Admiral Shares (VETFX)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expense ratio:</strong></td>
</tr>
<tr>
<td><strong>Min investment:</strong></td>
</tr>
<tr>
<td><strong>Turnover ratio:</strong></td>
</tr>
</tbody>
</table>

as of September 26, 2012. Source is Fact Sheet for this fund on the Vanguard web site.
Target-date Funds (retirement dates)

Pimco Target-Date 2015 Fund
(as of 9/21/2012)

<table>
<thead>
<tr>
<th>Assets</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core US bonds</td>
<td>43.94</td>
</tr>
<tr>
<td>Inflation-indexed bonds</td>
<td>24.81</td>
</tr>
<tr>
<td>Global bonds</td>
<td>2.88</td>
</tr>
<tr>
<td>Global equities</td>
<td>7.97</td>
</tr>
<tr>
<td>US large cap stocks</td>
<td>7.55</td>
</tr>
<tr>
<td>Emerging market stocks</td>
<td>2.81</td>
</tr>
<tr>
<td>Commodities</td>
<td>3.12</td>
</tr>
</tbody>
</table>

Note the mix of bond, equity, and alternative. The fund is rebalanced to more conservative as one ages. (As you age, you are not rolled into a new fund – the fund rebalances).

Pimco Target-Date 2050 Fund
(as of 9/21/2012)

<table>
<thead>
<tr>
<th>Assets</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term TIPS</td>
<td>12.19</td>
</tr>
<tr>
<td>US large cap stocks</td>
<td>22.07</td>
</tr>
<tr>
<td>Global equities</td>
<td>16.76</td>
</tr>
<tr>
<td>Emerging market stocks</td>
<td>11.87</td>
</tr>
<tr>
<td>US small cap stocks</td>
<td>10.40</td>
</tr>
<tr>
<td>Commodities</td>
<td>15.10</td>
</tr>
<tr>
<td>Real estate</td>
<td>11.21</td>
</tr>
</tbody>
</table>

This fund’s turnover rate is 42% in 2012. That is a lot of churn! This info is in the prospectus.


Your teacher’s growing suspicions about Target Date Funds

1. Their fee’s are usually quite high – some have loads.
2. They have high churn, which implies high embedded fees.
3. Many do not invest in stocks directly – they invest in other mutual funds (OK if the root funds are conservative) or other financial assets, including ETPs.

My advice – use index funds and rebalance yourself.
401-Ks and Mutual Funds

- See the assigned reading and all types of retirement accounts - the general categories will be **after exam in 2012**
- When you go to work you will be typically be given the option of investing in a 401-K
- Your employer will typically make part of the contribution, which is why you want to MAX it.
- You typically will be offered a limited selection of mutual funds
  - Look for index funds in the mix
- The fees may be fairly high for these funds
  - Employers don't always do a good job of getting these down
- When you change jobs, you have the right to transfer these funds into a **Rollover IRA** into a fund family of your choice. I recommend this.

The end result – a mutual fund portfolio

This is only an example and not being recommended here …