Objectives of investment

- at the individual level, investment decisions are related to investors’ preferences for current vs. future consumption and to their attitudes toward risk and uncertainty
- these aspects of preferences are usually dependent primarily on the individual investor’s age

- in many cases, individual investors delegate their specific investment decisions to *institutions*
• institutional investors act on behalf of clients, design products to meet their demands

• examples: mutual funds, pension funds, insurance companies, endowment funds, etc.

• the AIMR framework (text table 4.1):

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Constraints</th>
<th>Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return requirements</td>
<td>Liquidity</td>
<td>Asset allocation</td>
</tr>
<tr>
<td>Risk tolerance</td>
<td>Horizon</td>
<td>Diversification</td>
</tr>
<tr>
<td>Regulations</td>
<td>Risk positioning</td>
<td></td>
</tr>
<tr>
<td>Taxes</td>
<td>Tax positioning</td>
<td></td>
</tr>
<tr>
<td>Unique needs</td>
<td>Income generation</td>
<td></td>
</tr>
</tbody>
</table>

Investment companies

• investment companies are financial intermediaries who pool resources collected from individuals and invest on their behalf

• services provided:
  – administration and record-keeping
  – diversification and divisibility
  – professional management
  – reduced transactions costs
  – enhanced investment opportunities

• types include mutual funds (closed-end, open-end, segregated), commingled funds, and real estate funds (limited partnerships, mortgage funds)
there are thousands of mutual funds, and several different categories:
- money market
- equity
- fixed income
- balanced
- asset allocation
- index
- sector

hedge funds are similar to mutual funds, but have fewer regulations

the value of a share in a fund is called its net asset value (NAV):

$$\text{NAV} = \frac{\text{market value of assets} - \text{liabilities}}{\text{shares outstanding}}$$

open-end funds will issue new shares or repurchase existing shares at their NAV
- price of share always equals NAV (ignoring any load charges)
- number of shares outstanding changes constantly
- trade directly with the investment company

closed-end funds do not issue new shares or repurchase existing shares
- price of share can depart from NAV
- number of shares outstanding doesn’t change (unless new shares are issued)
- traded on financial exchanges
- closed end fund puzzle: when originally issued, shares tend to trade at premiums, subsequently on average trade at discounts
Performance of mutual funds

- online sources such as www.globeinvestor.com and www.morningstar.ca provide a lot of information about Canadian mutual funds

- costs of investing:
  - fee structure (front-end and back-end loads)
  - management expense ratio (operating expenses and other charges divided by total assets)

- rate of return:
  \[
  \text{rate of return} = \frac{\text{NAV}_1 - \text{NAV}_0 + \text{distributions}}{\text{NAV}_0}
  \]

- the effect of costs on performance:
  - suppose you invest $25,000 today in a fund which earns a 10% return per year. How much will you have after 30 years?
  - what if there is an MER of 0.5%?
  - how about an MER of 2%?
  - what if there is a front end load of 5%?
  - to do your own examples, see the SEC’s Mutual Fund Cost Calculator at http://www.sec.gov/investor/tools/mfcc/mfcc-int.htm
• evaluating the performance of mutual fund managers isn’t easy since we need to control for risk appropriately

• we will spend much more time on this issue later on in the course, but here suppose we use the Wilshire 5000 index as a benchmark

• what percentage of equity fund managers beat the index? (text Figure 4.5)

• the average equity fund underperforms the Wilshire index by over 1.5% per year

• not really a fair comparison, but even if we subtract 0.25% from the Wilshire index return each year, most fund managers still underperform


• do winners and losers repeat?

<table>
<thead>
<tr>
<th>Initial year</th>
<th>Next Year</th>
<th>Winner</th>
<th>Loser</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winner</td>
<td>65.1</td>
<td>34.9</td>
<td></td>
</tr>
<tr>
<td>Loser</td>
<td>36.6</td>
<td>63.4</td>
<td></td>
</tr>
<tr>
<td>1980s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winner</td>
<td>51.7</td>
<td>48.3</td>
<td></td>
</tr>
<tr>
<td>Loser</td>
<td>47.5</td>
<td>52.5</td>
<td></td>
</tr>
</tbody>
</table>
other findings by Malkiel:

- investing only in the top performing funds from the previous year would have worked well in the 1970s, but not in the 1980s
- the top twenty mutual funds in the 1970s did not in general perform well in the 1980s
- *Forbes Magazine*'s “Honor Roll” mutual funds did not beat the S&P 500 over the 1975-1990 period
- funds with higher expenses do not beat funds with lower expenses (on average)

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Exchange-traded funds

- ETFs allow investors to trade index portfolios as easily as shares of individual stocks
- earliest example was TIP; followed later by spiders (SPDR), cubes (QQQ), diamonds (DIA), i60s (XIU), various sub-indices, etc.

- advantages over mutual funds:
  - trade throughout the day, not just at closing price (as for mutual funds)
  - margin purchases and short sales are permitted
  - tax advantageous (avoids capital gains tax triggered by redemptions)
  - much lower fees (but have to be bought through a broker, so there is effectively a load)
Taxation and tax sheltering

- for basic treatment of interest, dividends, and capital gains see text Table 4A.1
- for an Ontario tax payer in the highest bracket in 2001, the retention rate on interest income was 53.59%, on dividend income was 65.07%, and on capital gains was 76.80%
- in reality, capital gains tax rates are effectively even lower due to being taxable only when realized and the ability to offset capital losses against capital gains
- on some bonds (zeros, savings bonds), investors pay tax on imputed interest, even though no interest income may be received during the year

- other things equal, investors should hold higher taxed investments in tax-exempt RRSPs
- sometimes the government subsidizes investment in certain sectors through tax shelters: a portion (up to 100%) of the amount invested is tax-deductible
- some insurance policies also offer tax deferral (e.g. variable annuities)
Pension funds

- two broad types: *defined contribution plans* and *defined benefit plans*

- in defined contribution plans:
  - employer (and sometimes employee) makes regular contributions into a retirement account
  - investment income accumulates tax-free
  - employee frequently has choice over what investments are made
  - upon retirement employee receives a life annuity
  - the employee faces considerable risk (investment risk while working, inflation risk during retirement)
  - the life annuity can be either fixed or variable (see text pp. 127-128 for an illustration of how variable annuities work)

- in defined benefit plans:
  - employee’s pension is an annuity, the amount of which is determined by a formula that usually depends on years of service and salary near retirement
  - example: University of Waterloo formula:
    * FAE = average rate of earnings in 36 continuous months of highest earnings during last 10 years of employment
    * CPP average = yearly maximum pensionable earnings averaged during year of retirement and 3 preceding years
    * Step 1: 1.4% of FAE up to CPP average
    * Step 2: 2% of (FAE - CPP average)
    * Step 3: (Step 1 + Step 2) × years of service = annual pension (annuity)
- the promised annuity is a liability for the employer
- defined benefit pension funds are portfolios of assets which serve as collateral for this liability
- ownership of pension fund surpluses is not clear in many cases, but it can affect the asset allocation decision
- if the pension fund is invested in risky assets such as equities, a variety of portfolio insurance strategies (e.g. contingent immunization) may be employed to eliminate the risk of a shortfall