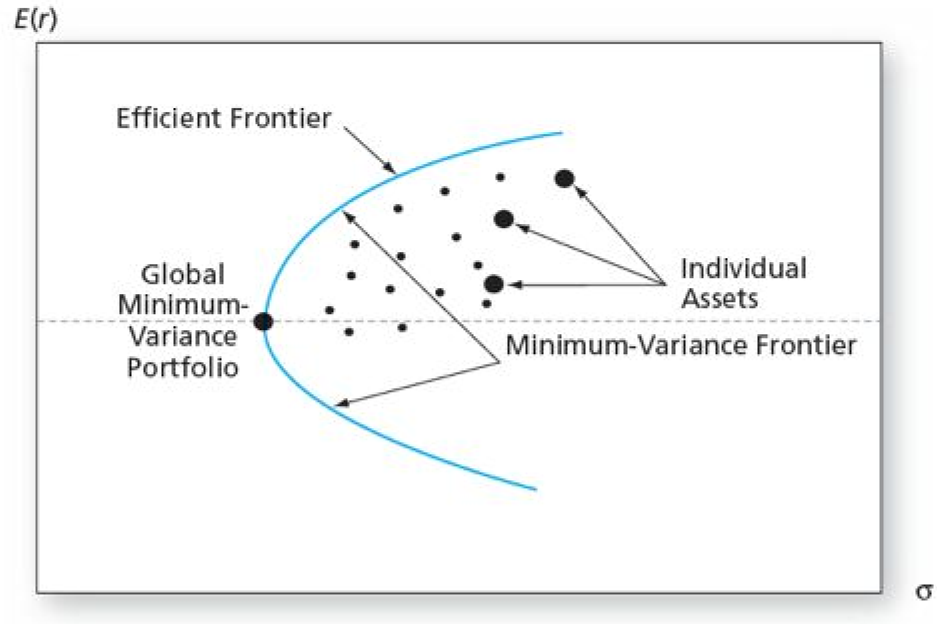
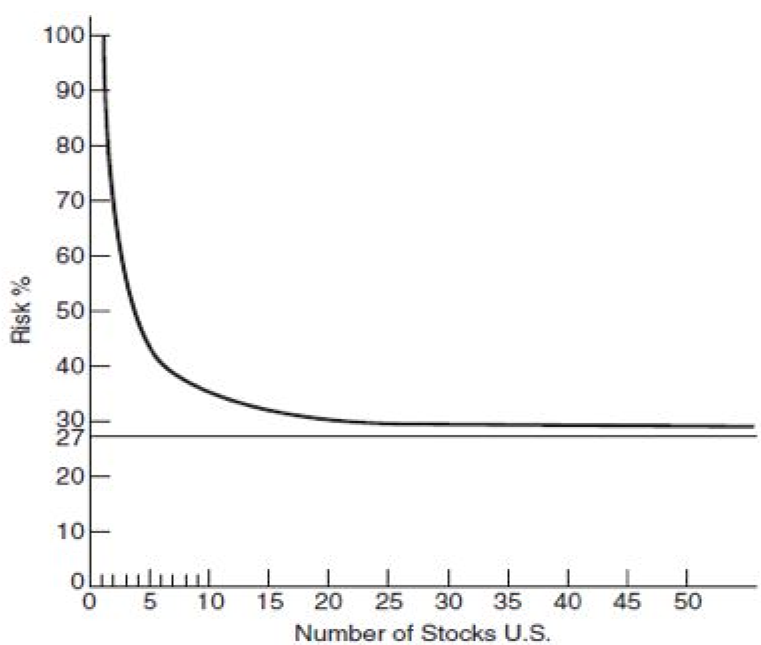
The Minimum-Variance Frontier of Risky Assets



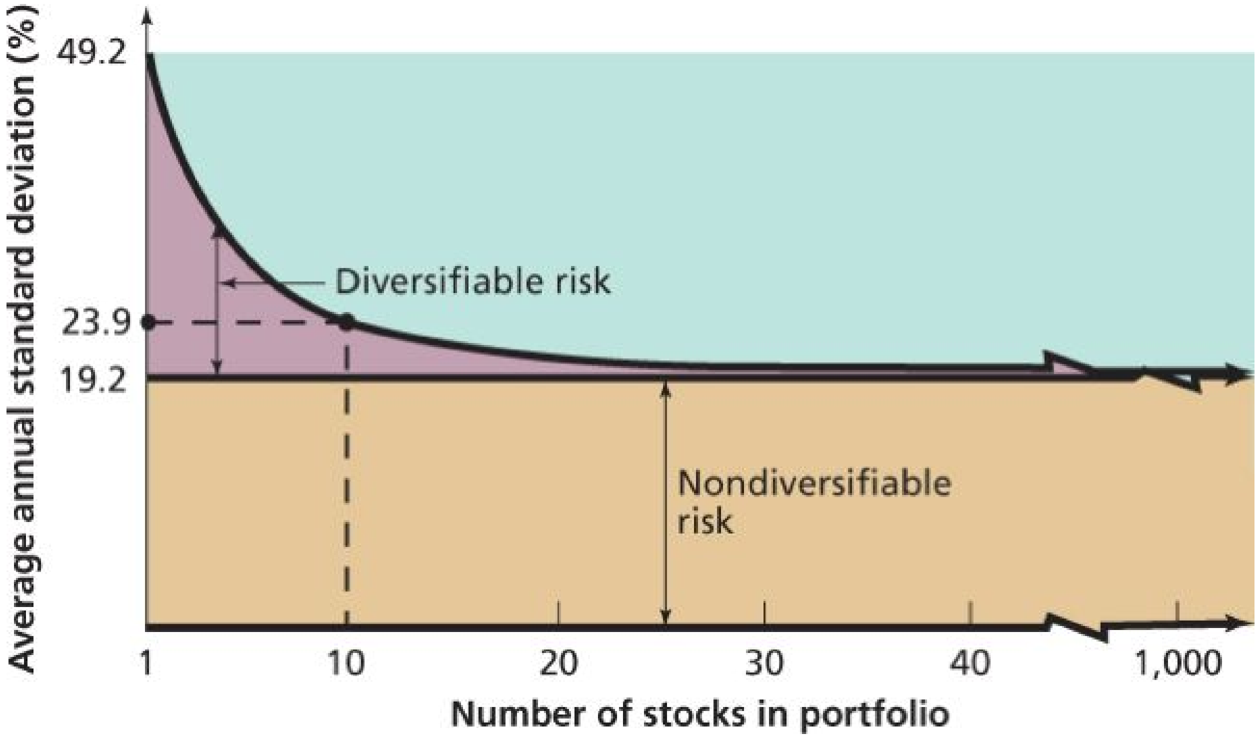
The Markowitz Efficient Frontier

- The Markowitz Efficient frontier is the set of assets with the maximum return for a given risk and the minimum risk given a return
- For the plot, the upper left-hand boundary is the Markowitz efficient frontier
- All the other possible combinations are inefficient. That is, investors would not hold these portfolios because they could get either:
    - More return for a given level of risk
    - Less risk for a given level of return

The effect of the number of securities on risk of the portfolio in the United States



Diversification and Risk



The effect of diversification

- The individual risk of each asset can be diversified away but the contribution to the total risk caused by the covariance terms cannot be diversified away

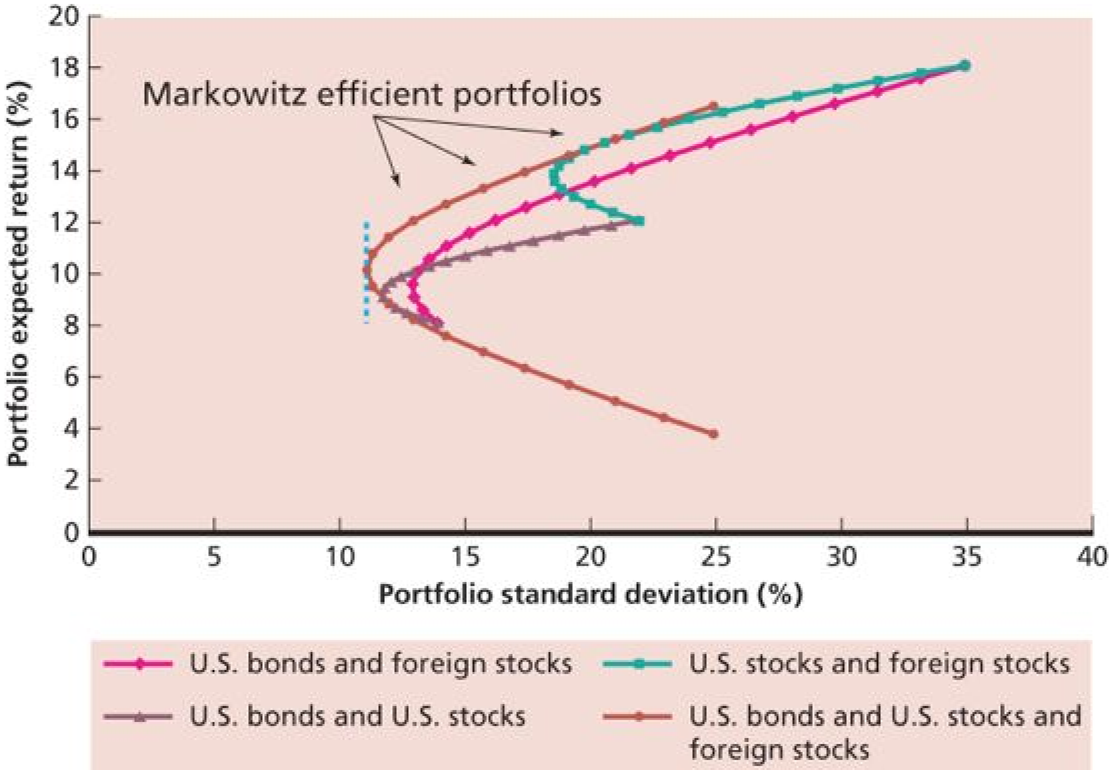
Diversification and Portfolio Risk

- Market Risk
    - Risk attributable to market-wide risk sources and remains even after extensive diversification
    - Also, call systematic or non-diversifiable risk
- Firm-specific risk
    - Risk that can be eliminated by diversification
    - Also called diversifiable or nonsystematic

Ways to Diversify

- Diversifying using asset classes, industries, currencies, or countries
- Allocation between asset classes -- need estimates of mean returns, standard deviations, and covariance/correlation coefficients. Often estimated from historical data
- Domestic and foreign stocks are industry or country effects stronger?

Risk and Return with Multiple Assets



Diversification

- But what tends to happen to correlations between different assets in times of crisis?
- Correlations between assets returns do not stay constant over time

The Efficient Frontier and Short Selling

- So far we assumed positive weights in our assets allocation. What if you can negatively weight some assets?
- Is short selling bad?
  - Considered riskier than going stocks (max loss when you are long is your investment, shares can't be worth less than zero. Max loss, when you are short, is infinite)
  - Considered destabilizing for the market - short-selling hedge funds
- Many pension funds and mutual funds not permitted to take short positions
- Some governments have in the past banned short sales

How an asset is sold short

1. Borrow the share or bond you want to bet against, with a promise to return the shares at a prearranged later date
2. Sell the shares you have borrowed and keep the proceeds from the sale
3. Wait for the stock to fall and then buy the shares at the new lower price
4. Return the shares to the brokerage you borrowed them from and keep the profit

An example

- Shares of ABC Company are trading for 40 a share, which you think is too high
- You contact your broker who borrows 100 shares from another investor. YOu sell the shares for 4000
- Two weeks later the company reports its CEO has been embezzling money and the stock falls to 25 a share
- You buy 100 shares of ABC company for 2500 return the shares to the broker and earn a 1500 profit

Is short selling bad?

- Temporary short-selling bans were introduced in the US, United Kingdom, Germany, France, Italy, and other European countries in 2008 to minimal effect
- Spain and Italy introduced short-selling bans in 2011 and again in 2012
- Worldwide, economic regulators seem inclined to restrict short selling to decrease potential downward price cascades, Investors continue to argue this only contributes to market inefficiency
- Don’t shoot the messenger? Short sellers rather than causing prices to fall may anticipate a fall in price, exposing malpractice, a price bubble or a deteriorating firm