

# **Quantitative finance**

## **Lecture 6**

# Investment: Global Bond Portfolio

## Low Positive Correlation

- Low positive correlations among returns indicates substantial opportunities for risk reduction
- Why? International trade patterns, economic growth & fiscal & monetary policies differ between countries

### EXHIBIT 3.5

Correlation Coefficients between Rates of Return on Government Bonds in Canada and Selected Foreign Markets: 1993–April 2009 (monthly data, in Canadian dollars)

	Correlation Coefficient
United States	0.370
United Kingdom	0.282
Germany	0.590
Japan	0.093
Switzerland	0.216

Source: Bloomberg.

# Investment: Global Bond Portfolio

## Low Positive Correlation

- Opportunities for investors to reduce risk
- Correlation changes over time
- Adding non-correlated foreign bonds to a portfolio of Canadian bonds increases rate of return & reduces portfolio risk

# Investment: Global Equity Portfolio

## Low Positive Correlation

- Correlation of world equity markets resembles that for bonds
- Canada–U.S. correlation is relatively low ranging from .537 to .635 but is a very low .389 when comparing Canada & Japan

### EXHIBIT 3.7

Correlation Coefficients between Rates of Return on Common Stocks in Canada and Other Foreign Stock Markets: 1993–March 2009, in Canadian Dollars

	Correlation Coefficient
United States—S&P 500	0.635
United States—DJIA	0.537
United States—Russell 3000 <sup>a</sup>	0.692
Japan—Nikkei 225	0.389
United Kingdom—FTSE 100	0.538

<sup>a</sup> Russell 3000 data from 1996

Source: Correlation table computed by the authors using monthly data from Bloomberg.

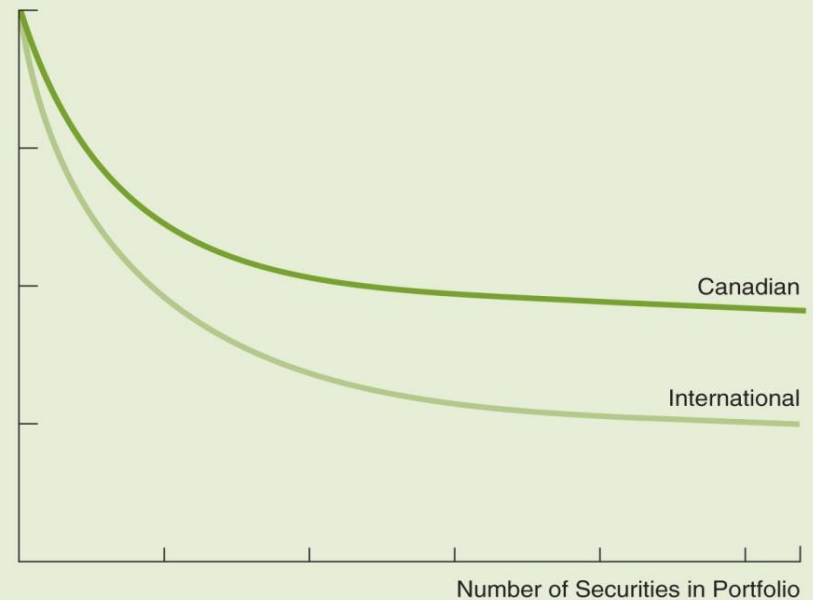
# The Case for Global Investment: Global Equity Portfolio & Risk Reduction

- Opportunities to reduce risk of a stock portfolio by including foreign stocks

**EXHIBIT 3.8**

Risk Reduction through National and International Diversification

Standard Deviation of Portfolio Relative to  
Standard Deviation of Typical Stock



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# Global Investment Choices

- Fixed-Income Investments
  - Bonds and preferred stocks
- International Bond Investing
  - Eurobond, Maple bonds, international domestic bonds
- Equity Instruments
- Special Equity Instruments
  - Warrants and options
- Futures Contracts
- Investment Companies
- Real Estate

# Fixed-Income Investments

- Basic concepts of fixed-income investments
  - Contractual payment schedule
  - Recourse varies by instrument
  - Bonds
    - Investors are lenders
    - Expect interest payment and return of principal
  - Preferred stocks
    - Dividends require board of directors approval

# Fixed-Income Investments

- Savings Accounts
  - Fixed earnings
  - Convenient
  - Liquid and low risk
  - Low rates
- Certificates of Deposit (CDs)
  - Usually less than 1 year in maturity
  - Usually insured by CDIC
- Guaranteed Investment Certificates (GICs)
  - Usually issued with terms greater than 1 year
  - Usually insured by CDIC

# Fixed-Income Investments

- Fixed income obligations that trade in secondary market
- Corporate bonds – issued by corporations to fund long-term commitments
- Bankers Acceptances – issued by banks to fund short term (less than 1 year) obligations
- Government of Canada bonds & T-bills
- Provincial government bonds
- Agency bonds are issued by Crown corporations
  - Example: Canada Mortgage and Housing Corporation (CMHC)