

## Chap. 15 International Portfolio Investment

- Benefits of International Equity Investing
- International Bond Investing
- Measuring Total Return: the Addition of Currency Risk.

• Nov. 5, 2002 by William Pugh

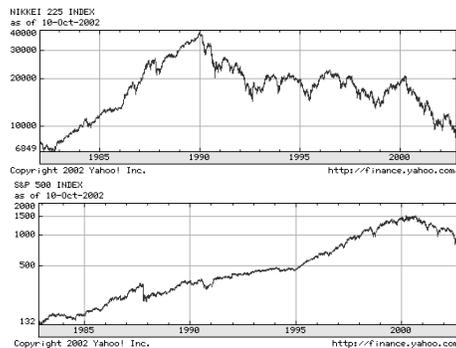
## International Equity Investing

- 1. **Offers more opportunities than a pure domestic portfolio:** Nokia is a leading cellphone producer. Asia is making high quality electronics and automotive products. Potentially, China Telecom has a huge market.
- 2. International Diversification: **Risk may be reduced through global diversification:** other countries have different business cycles. **When or if you need to sell to raise cash, the U.S. may be in a recession.**

## International Equity Investing

- At the beginning of 2000, an American may not have thought global diversification was a good idea **given the superior performance of the U.S. over the last decade.**
- We have suffered much since
- At the end of the 1980s, the Japanese probably thought the same thing as their market had outperformed others.
- Since then, however, Japan's market has fallen sharply, from about 38,000 points to as low as 8400.
- Graph on next slide

## Japan's Nikkei 225 compared with the S&P 500



## International Equity Investing

- **Capitalization:** stock price times number of shares outstanding.
- What it would cost to buy every share in a country's stock market. (not really)
- United States: about **50% of world's stock value.**
- Japan: about 15% (was as high as 50% in 1990).
- Next: Great Britain,
- Germany and France switch back and forth for fourth and fifth place.

## International Equity Investing

- Certainly, **investors in small countries should globally diversify** - if only to get more diversification across industries.
- Developed markets: Include The USA, Canada, W. Europe, Australia, N. Zealand, and Japan.
- These markets have had wide differences in returns and risk. **Exhibit 15.1**
- International Performance often measured by Morgan Stanley's EAFE index (where the largest component is Japan)

## International Equity Investing

- When considering to invest in a foreign market, you need to consider both the **market's risk** ( $\sigma_{for}$ ) and its **correlation** ( $\rho_{US,for}$ ) with your home market (or your existing investments).
- **Best diversification** is with other markets that are **not well correlated** with your own.
- Exhibit 15.2, 15.6 give different nations' stock market correlation with USA.
- **Canada highest (thus worst), Japan lowest (thus best)** among developed countries.

## International Equity Investing

- **Emerging markets** have **higher risk** than developed markets, and until recently, higher returns.
- Examples: all of Asia excluding Japan, Latin America, East Europe, Africa, MidEast. (in order of market size)
- **Major benefit: Cross-market correlations of the emerging markets with USA tend to be very low.**
- **Exhibit 15.10**

## International Equity Investing

- Correlation and the Gains From Diversification: **Foreign market Betas**
- **Beta** = Correlation [ $\sigma_{for} / \sigma_{US}$ ]
- You derive the greatest reduction in U.S. portfolio risk by investing in countries that have a **combination of low volatility and low correlation** with your home stock market
- Exhibit 15.3 demonstrates how portfolio risk is lowered with global diversification.
- Exhibit 15.4 shows how the World index is "smoother" (less risky) than either the US or EAFE indexes.

## International Equity Investing

- Calculation of Expected Return of a global portfolio:
- $$r_p = a r_{US} + (1 - a) r_{rw}$$
- where  $r_p$  = portfolio expected return
- $r_{US}$  = expected U.S. market return
- $r_{rw}$  = expected return for the "rest of the world"
- $a$  = percent invested in US assets

## International Equity Investing

- Calculation of Expected Portfolio Risk ( $\sigma_p$ )
- $$\sigma_p = [a^2 \sigma_{US}^2 + (1 - a)^2 \sigma_{rw}^2 + 2 a (1 - a) \rho_{US,rw} \sigma_{US} \sigma_{rw}]^{1/2}$$
- $\rho_{US,rw}$  = the cross-market **correlation**
- $a$  = proportion of the portfolio in the U.S. (use decimal)
- $\sigma_{US}^2$  = variance of U.S. returns
- $\sigma_{rw}^2$  = variance of International returns
- (note: **global** and **world** usually mean **all markets**)
- See Exhibit 15.8 for an **example of  $r_p$  and  $\sigma_p$  holding different proportions of US and foreign assets.**

## International Equity Investing

- Methods to Diversify
- 1. Invest in **U. S. Multinational Corporations**.
- 2. Invest **American Depository receipts** (ADRs) or similar "American shares".
- 3. Hold internationally diversified mutual funds: (**open- or closed-end**)
  - a. Global Funds (U.S. and foreign assets)
  - b. International Funds (foreign only)
  - c. Regional or "country funds"
  - d. WEBS (or **exchange-traded funds**) on the American Stock Exchange.
- Symbols EWT,EWM,EWA,EWG,EWS,EWJ,EWK, etc.

### Investing in U.S. Multinationals

- Having earning from overseas **'should'** make the company less dependent on the U.S. economy. Ex. Coca Cola earns 80-90% of its earnings overseas. McDonalds, Caterpillar, Boeing, etc. are similar.
- Problem: U.S. based MNCs still appear to be **correlated**, and **not really distinct from the performance of a U.S. stock portfolio**.
- In the long-term the strategy **may** work, but it appears to be **diversifying only in theory** .

### American Depository Receipts

- ADRs essentially allow foreign securities to trade in U.S. stock markets.
- Over 1000 foreign companies trade on the US, either on the NYSE or NASDAQ.
- Examples BP, SNE, TM, GLX, DMC, TMX
- **The ADR simply "represents" the actual foreign shares** (which are deposited at a trust bank). The ADR may represent one share or ten shares, or even a tenth of a foreign share.
- Info on ADRs can be found on [www.adr.com](http://www.adr.com)

### American Depository Receipts

- The **benefits of the ADR** (over owning the foreign shares directly)
- (1) Easier and cheaper buying and selling: **All transactions are done in dollars**, in the U.S. and **during regular U.S. trading times**.
- (2) **Dividends automatically converted to dollars, probably at the 'wholesale' (money-center bank) exchange rate**.
- (3) **Financial and accounting information** is required to **conform** (at least partially) **with U.S. standards**.

### American Depository Receipts

- **ADRs and the underlying foreign stock are linked** through the process of **arbitrage**: since the ADR and stock are substitutes, the arbitrageur will buy the cheapest one and sell or short-sell the more expensive one.
- **ADR (in \$) = (foreign stock price)(CR)(e<sub>0</sub>)**
- Where the **stock price is in the local currency**,
- and **e<sub>0</sub>** is the exchange rate **in American terms**.
- **Note: the ADR price is directly related to the currency value. (thus, there's still currency risk)**

### American Depository Receipts

- the **CR is the conversion ratio** between the ADR and the foreign stock. **CR = #for shares/#adrs**. CR is **'one-to-one'** maybe half the time: usually for Germany and Japan. E.g. Sony and Daimler-Chrysler shares are each represented by one ADR.
- The **UK tends to have low-priced shares** because they issue extra shares through **rights offerings**.
- The **Swiss rarely split shares** so their stocks are high priced.
- Emerging markets usually have low-priced shares.

### American Depository Receipts

- If Glaxo sells in London for 12 pounds, there are two foreign shares for one ADR and the pound is worth \$1.60.
- What should the ADR sell for ?
- **FS CR e<sub>0</sub> = adr**
- **(£12/share)(2sh/1adr)(\$1.60/£) = \$38.40/adr**
- Prices may not match up because
- 1) adr's may be the only way for foreigners to buy the shares (the adrs will then sell at a premium)
- 2) Asynchronous trading (think time zones)

### International Bond Investing

- Bond markets: ***The biggest by far is for U.S. dollars, in particular Treasury securities.*** These markets have grown a great deal in recent decades because of large and persistent balance of payments differences: ***The U.S. has issued many bonds to finance past federal deficits.***
- ***Japan, Hong Kong, China, etc., have purchased these bonds as they have had persistent trade and current account surpluses.*** The need to invest capital surpluses is a major driver in the expansion of the debt markets.

### Developed Country Bonds

- Adding international bonds to a diversified portfolio can lower a portfolio's risk-return ratio, and may even raise returns.
- In the case of developed country bonds, these bonds are usually pay interest and principle in a major hard currency (EUR, CHF, Yen, GBP, CAD, or AUD).
- Since bond prices do not vary as much as stock prices, ***most of the risk is currency risk.***
- ***Thus, good if the USD is weakening.***

### Emerging Market Bonds

- These are the ***Junk Bonds*** of international investing.
- These bonds are usually issued in dollars, as lenders ***are unwilling to assume the currency risk.***
- There really is still currency risk in the sense that a sharp devaluation makes it very difficult for LDC borrowers to repay dollar liabilities.
- Recall USD bank deposits in Argentina (and Mexico in the 1980s) were forcibly converted to local currency.
- Volatile, these bonds are often ***a good buy after crises*** (which seem to occur every few years).

### International Bond Investing

- Fidelity offers a well-run fund that invest in these bonds (New Markets Fund). Also Scudder.
- There are also closed-end funds. (TEI, etc.)
- I question the necessity (or wisdom) of adding international bonds to a portfolio.
- Transactions costs may be high and many of the famous "***hard currencies***" such as the Yen and the Swiss franc ***offer very low yields.*** These are ***in effect pure currency plays.*** You should be better off in Swiss and Japanese ***equities.***

### International Bond Investing

- The "King of Indexers", the Vanguard Group does not offer an international bond fund for similar reasons. That being said, if you wished to speculate that the dollar will fall, these bonds may well - if interest rates don't rise). However, there are better ways of betting on currencies.
- We like the U.S. bond market as a good medium term asset: some risk reduction with a decent real return. You don't get that with international bonds.

### Measuring Total Return: the Addition of Currency Risk.

- ***In almost all cases equities are priced in the currency of the foreign country.***
- ***Bonds issued by developed countries, and corporation within those countries are mostly in the foreign currency.*** Sometimes they are issued in a more widely used currency where they can get lower rates (Denmark probably borrows a lot in Euros).

### Measuring Total Return: the Addition of Currency Risk.

- **Bonds issued by less developed countries (LDCs)**, and corporations within those countries are **mostly in another currency: often the dollar**. With the interest rate of the Euro lower than that of the dollar, many LDCs are now borrowing in Euros.
- When your portfolio investment is in a foreign currency, you are investing in two risky assets: the security and the currency.

### Measuring Total Return: the Addition of Currency Risk.

- (With Emerging markets there is usually **“hidden” currency risk** - if the local currency falls too sharply it can wreak the local economy and hurt the value of your stocks and bonds (Mexico was a good example of this in 1995, Asia in 1998).
- The security and currency returns “compound”
- $(1 + R_s) = (1 + R_{for.stk}) (1 + R_{currency})$

### Measuring Total Return

- Text’s ugly bond return formula:
- $1 + R_s = [1 + \frac{B(1) - B(0) + C}{B(0)}](1+g)$
- where  $R_s$  = dollar return
- $B(1)$  = foreign currency bond price at time 1
- $C$  = coupon income
- $g$  = depreciation/appreciation of foreign currency
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### Measuring Total Return

- The text’s ugly stock return Formula:
- $1 + R_s = [1 + \frac{P(1) - P(0) + D}{P(0)}](1+g)$
- where  $R_s$  = dollar return
- $P(1)$  = foreign currency stock price at time 1
- $D$  = foreign currency annual dividend
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### Measuring Total Return

- A different view of the same formula:
- $(1 + R_s) = \frac{P_1 + CF}{P_0} \times \frac{e_1}{e_0}$
- where  $R_s$  = dollar return,  $P$  = Price of stock or bond in foreign currency at times 0 or 1,  $CF$  = any cash payment,  $e$  = spot rate at times 0 and 1.
- $1 + R_s = \frac{Wf_1}{Wf_0} \times \frac{e_1}{e_0}$
- where  $Wf$  is wealth in the foreign currency.

### Measuring Total Return

- Suppose you buy a British Bond (Gilts for “gilt edged”) for £ 1000 and it pays £ 80 in interest over a year. When you purchased the bond, the pound sold for \$1.80, however, it has since slipped to \$1.50, due to lower interest rates in the UK. What was your \$ rate of return? The bond rises to £1,020 over the year due to the lower UK rates.

### Measuring Total Return

- $1 + R_S = \frac{\pounds 1,020 + \pounds 80}{\pounds 1,000} \times \frac{\$1.50/\pounds}{\$1.80/\pounds}$
- $1 + R_S = .9167$
- $R_S = -.0833$
- Over an eight percent loss!

### Measuring Total Return

- Note: if the currency is in **indirect quotes** (like the Yen) it is easiest to simply plug in those same quotes - and just inverting the last factor.
- $(1 + R_S) = \frac{P_1 + CF}{P_0} \times \frac{1/e_0}{1/e_1}$
- You buy Sony at 10,000 Yen and one year later it is at 8,000. During the same time the exchange goes from Yen140/\$ to 100.
- $(1 + R_S) = \frac{8000}{10000} \times \frac{140}{100} = 1.12 = 12\%$

### Hedging Currency Risk

- **Some managers of international funds** assume that their clients are more interested in investing in, say, the German stock market, than they are in investing in the Deutsche Mark.
- **Others fund managers** believe that for many “**hard currency**” countries like **Germany, Switzerland and Japan**, the currency is a major part of the appeal of investing overseas.
- Only the first group will “**hedge**” all or some of the currency exposure.

### Hedging Currency Risk

- **Hedging can be fairly simple:** suppose your portfolio contains 2 million DM worth of stock and you worry about the German currency falling. You can sell up the same amount of DM on the futures market (up to 16 contracts) at the prevailing “**forward rate**”. **This is similar to short selling** in that you don’t actually have DM, just stocks that trade in D-Marks.
- You have “**locked in**” the dollar value of **your currency** and now **all that will be uncertain is the stock-market risk.**

### Hedging Currency Risk

- Like **short selling**, you will make money if the **DM falls in value** from where you sold it.
- This futures profit should offset currency losses in the stock portfolio.
- **What if the currency goes up?**
- Guess you shouldn’t have hedged. The currency gains in your portfolio will be “neutralized” by your short-sale losses.

### Hedging Currency Risk

- **What happens at the end of the contract?**
- **Contracts expire** on the third Wednesday of the **maturing month**. **Normally you reverse the trade before expiration** (or you will have to deliver DM you really don’t have). **When you reverse the trade, it is like covering a short sale in the stock market.**
- **What happens after I cover?** You *book* your gain or loss (adding to the gain or loss of the portfolio) and **if you wish to continue to hedge**, you essentially “**rollover**” to a new contract.

### Hedging Currency Risk

- **What determines the price I hedge at? It is often different from the current exchange rate.**
- **The forward rate is set by a process called interest rate parity (IRP).** IRP essentially means that if you wish to sell your currency exposure on the futures market **you will sell DM for more** than they are currently worth and **Mexican Pesos for (much) less than the spot rate.**

### Hedging Currency Risk

- The formula is  $F_1 = e_0 (1 + r_{us}) / (1 + r_{for})$
- The U. S. rate is about 5%, Germany is about 2.5 to 3%. The Mexican rate is about 18%.
- **The DM currently sells at a forward premium, the peso at a forward discount.**
- Ex: the peso discount exists because people who will be receiving a payment in Pesos in one year and wish to hedge the risk, must either
- 1) sell the pesos on forward market at a awful discount or ...

### Hedging Currency Risk

- 2) create an offsetting peso debit **by borrowing pesos from a bank and paying high rates.** The loan proceeds are **immediately converted to dollars** (and can earn \$ interest) and the **loan (and interest!) is paid off** in one year **with the pesos you expect to receive.**
- Since both methods will hedge the risk, we say there is a **link between the forward rate discount** and the **difference in the two interest rates.** You can probably guess that managers of Mexico Fund find hedging too expensive!

### Hedging Currency Risk

- The IRP relationship is really about *the opportunity cost of capital.*
- **IRP works for the gold market too.** If you want to invest in gold, you have two ways to do it: buy gold today with your capital, or **contract** to buy gold in the future and hang on to your capital (earning the RFR). IRP predicts that **if gold is selling for \$300/oz today**, you can **contract to buy it for \$315/oz in one year.**