CHAPTER XI

INTERNATIONAL EQUITY MARKETS

This chapter studies the specific characteristics of national stock markets. National stock markets tend to have not only different legal and physical organization, but also different transaction and accounting methods. Recall that stock markets provide valuable information about publicly traded corporation. Different organizations and macroeconomic environments will affect the quality of the information disseminated by a stock market. The better a market is at disseminating information, the more attractive it becomes to international investors. This chapter begins with a general review of the major differences among international equity markets and market microstructure issues. Then, the chapter looks at some practical issues, relevant to international investors. We end this chapter analyzing why international investors care about international markets.

I. General Overview and Differences

In this section we discuss the broad differences among international equity markets. We focus on three areas where markets differ: liquidity, taxation, and stock market benchmarks.

1.A Liquidity

Liquidity refers to the ability to transform a non-cash asset into its cash equivalent without a loss of principal. That is, liquid markets are markets where exit is relatively easy. Other things being equal, international money managers will prefer to invest in liquid markets. Given the preference for liquid stocks, illiquid stocks should offer a higher compensation. This compensation is called the *liquidity premium*. In the U.S., Ang et al. (2011), in a comparison of listed (liquid) stocks and OTC (illiquid) stocks, report an average estimated liquidity premium of 2.51% per year, but this return will be realized only if investors demand liquidity –i.e., can wait- once a year. But, if investors demand liquidity once a month, the liquidity premium is negative: -5.07%! In emerging markets, the liquidity premium has been estimated at 3.2% per year.

There are several ways to measure the liquidity of a market. Measures based on size, volume and bid-ask spreads are good liquidity indicators.

1.A.1 Measures of Size

1.A.1.i. <u>Capitalization/GDP</u>

A broad measure of liquidity -and easy to calculate- is total market capitalization (see Table XI.1). According to this measure, the largest equity market in the world is the U.S. market, with a market capitalization of USD 26.2 trillion in 2014. For the same year, the second largest equity market was the Chinese market with a market capitalization of USD 4.0 trillion, while the third largest market was the Japanese market with a market capitalization of USD 3.8 trillion.

The U.S. capital market is large compared to the U.S. economy. In 2014, the U.S. stock market capitalization represented roughly 150% of the U.S. GDP. During the same year, the market capitalization/GDP figure for Germany was only 44%, while the corresponding figure for Mexico was 38%. There are different reasons that explain these different ratios.

Stock Exchange	Market Cap	Nominal GDP	Market Cap/GDP
USA (NYSE Euronext +NASDAQ)	26.240	17.416	151%
China (Shangai + Shenzen)	6.005	10.355	57%
Japan (Tokyo SE)	4.378	4.770	92%
UK (London SE Group)	6.370	2.847	224%
India (Bombay + National SE)	3.324	2.047	162%
Hong Kong Exchanges	3.233	0.274	1,180%
Canada (TMX Group)	2.094	1.827	146%
Brazil (BMM&FBOVESPA)	844	2.244	38%
Australia (Australian SE)	1.289	1.506	86%
Germany (Deutsche Börse)	1.739	3.820	37%

TABLE XI.1Market Capitalization in 2014 (in USD trillions)

In many European countries corporations are undercapitalized and rely heavily on bank financing. In Europe, banks tend to provide corporations with all financial services. They assist them in their commercial needs as well as in their long-term debt and equity financing. It is common for European banks to own shares of their clients. In Germany 15% of large German firms are bank controlled, while the percentage reaches 30% in Belgium. In the U.S., commercial banks were prohibited by the Glass-Stegall Act to participate in their clients' equity. Thus, U.S. companies, especially small ones, are used to go public to raise capital in the marketplace.

In other countries, many large firms are state owned and some of them are not listed on the capital markets. In a recent study of corporate control of large firms in 27 countries, most of them industrial countries, La Porta, Lopez de Silanes, and Shleifer (1999) estimate that 18% of firms are state owned. In Italy, for example, a large part of arms-manufacturing, oil, chemical, electronic, automobile, banking, insurance, and transportation industries is owned by the government.

Family ownership is another factor that influences market capitalization. Many family-owned firms are reluctant to list their stock in an exchange for fear of losing family control. Family ownership of large firms is unusual in the U.S. In other countries, however, family ownership is extremely common. For example, in Israel 50% of large firms are considered family-controlled. In Hong Kong, the percentage of family-controlled large firms is 70%.

As a final note regarding this measure, some analysts, including Warren Buffet, use the MC/GDP measure as a valuation metric to identify what markets are under-/over-valued. Under this view, the higher the ratio, the more overvalued the market.

1.A.1.ii <u>Transaction volume</u>

Another measure of liquidity and exchange activity is transaction volume. Not surprisingly, New York and Tokyo have the largest share turnover. Depending on market activity, these figures can vary widely from one year to the next, but in general most major markets enjoy a similar degree of liquidity in terms of transaction volume. In fact, the annual turnover ratio (TR) -i.e., the ratio of annual transactions in USD to year-end USD market capitalization- varies significantly over time. Therefore, comparison of national market liquidity based on the TR could lead to different conclusions if different years are taken into account.

Example XI.1: From 1995 to 2002 the U.S. annual turnover varied from 65% to 94%, while the same statistic ranged from 45% to 90% for Thailand. In contrast, for the same period, the TR changed from 101% to 235% for Korea. \P

The main problem with transaction volume is that it is reported as an average, usually monthly or annual number. Some stocks may have a good average, say daily average turnover, but the average is not representative; there are many days with no trading. That is, the stock seems on average liquid, but in many days it would be very difficult to trade. Using this intuition, it is common to use the number of non-trading days as a liquidity measure. For example, the average proportion of non-trading days (90-08) in U.S. listed stocks is 10%, while in Thailand the average proportion is 37%.

If daily volume is not available, the number of *zero return days* can be used as a proxy. After all, if a stock price is unchanged, it should be the result of two events: (1) no information, or (2) no trading. The proportion of zero return days is an easy measure to calculate. Stock prices are the only input needed. Lang, Lins and Maffett (2009), in a study of well-developed EAFE markets, report that the median listed stock has a zero return on 24.5% of the trading days per year and has a bid-ask spread of 1.9%.

1.A.1.iii Degree of concentration found in the major markets

Another informative statistic related to liquidity is the degree of concentration found in the major markets. It is important for the investor to know whether a national market is made up of many small firms or concentrated in a few large firms. Institutional investors are reluctant to invest in small firms for fear that they offer poor liquidity. In addition, this statistic can be indicative of diversification opportunities for passive investors. The more concentrated a national equity market is in a few stocks, the less diversification benefits arise for a passive investor.

Table XI.2 presents the market share of the 10 largest companies in each national stock market.

TABLE XI.2

Market share of the 10 largest companies in each national stock market (1994 and 2014)

Country	1994	2014
U.S.	11.9	13.3
Japan	20.2	16.3
U.K.	23.2	12.2
Canada	25.2	11.5 (2010)
Malaysia	35.6	31.1 (2013)
Australia	40.6	54.1
Italy	51.7	80.2 (2011)
Spain	56.2	46.8
Switzerland	67.0	69.2
Netherlands	74.3	81.3

Source: Emerging Markets Factbook, IFC, World Federation of Exchanges.

It is worth noticing that, in 2015, the largest company in the U.S. was Apple (APPL) with a 2.7% share of total market capitalization (in 1994, the largest company was GM, with a 1.8% share). By contrast, in the Netherlands the largest company was Royal Dutch/Shell with a 30% share of the market capitalization.

1.A.2 <u>The bid-ask spread</u>

A market maker buys and sells shares of a company. When a market maker buys shares (at the *bid quote*), she expects to sell those shares in the future (at the *ask quote*). The longer it takes to receive a buy order, the costlier the transaction becomes for the market maker. The market maker will require a higher compensation for shares that takes longer to sell. A higher compensation for a market-maker means a higher *bid-ask spread*. A market maker will have small bid-ask spread for the shares of a company that he/she expects to receive frequent buy and sell orders. The smaller the bid-ask spread for the shares of a company is, the more liquid those shares are. Similarly, the higher the average bid-ask spread of a stock market, the less liquid that stock market.

For example, in the NYSE the average bid-ask spread, as a percentage of the price, is around 0.6%, while in Thailand the average bid-ask spread is 5.14%. For the EAFE sample, studied by Lang et al. (2009), the median bid-ask spread is 1.9%.

1.B Stock Market Benchmarks

Stock market benchmarks allow an investor to measure the average performance of a national stock market. There are several stock market indexes that are used to benchmark the performance of a given market. That is, one or several indexes may track a national market at any given time.

1.B.1 International Stock Indexes

For many years, Morgan Stanley Capital International (MSCI) has been publishing a monthly newsletter, *Morgan Stanly Capital International Perspectives*, with national market value-weighted indexes on 22 developed markets based on approximately 2600 stocks. Their indexes are constructed to avoid double counting. These indexes have been available since 1970 and cover at least 60% of the market capitalization for each country. They also publish regional indexes. The most popular regional indexes are the World Index, and the European, Australasia, and Far East (EAFE) Index. These indexes are used widely by international money managers for asset allocation decisions and performance measurements. In 2004, MSCI acquired Barra, the consulting firm. MSCI Barra publishes related information on their sample of stocks, including financial ratios such as price earnings, price to book value ratios, yield, as well as risk models. Today, MSCI Barra calculates over 120,000 equity and REIT indices daily. All the MSCI indexes can be found at MSCI Barra's website at www.mscibarra.com.

Since 1987 the *Financial Times* publishes the FT-Actuaries world indexes in association with Goldman Sachs and Wood MacKenzie. Twenty-two national indexes are provided as well as numerous industrial and regional indexes. The most important of the regional indexes are the World index, the Europe Index, the Pacific Basin Index and the Europe and Pacific Index. The FT-Actuaries indexes have a wider coverage than the MSCI indexes since they are based on a sample of around 2400 stocks and cover more than 60% of each market capitalization.

More recently, the Dow Jones Co., started to publish similar indexes, which are available through the *Wall Street Journal*. Other popular international equity benchmarks are produce by Salomon Brothers and Frank Russell, Union de Banques Suisses (UBS), and First Boston.

1.B.2 Domestic Indexes

Local indexes are widely used by domestic investors to calculate performance, market betas, hedge ratios, etc. Private international investors often prefer domestic indexes for the following reasons:

(1) local indexes have a broader coverage of stocks (they give the idea of the market portfolio).

(2) local indexes are available immediately.

(3) local indexes have been used for several decades and therefore there is more data available.

Example XI.2

: On February 15, 1996, the *Wall Street Journal* published the following international domestic (MSCI Stock Market Indexes are also published in the same page of the WSJ):

EXCHANGE	2/14/96 CLOSE		NET CHG		PCT CHG
Amsterdam ANP-CBS General	343.6	+	0.8	+	0.23
Argentina Merval Index	545.04	-	9.22	-	1.66
Australia All Ordinaries	2300.8	+	11.1	+	0.48
Brazil Sao Paulo Bovespa	53308	-	547	-	1.02
Brussels Bel-20 Index	1661.61	-	1.83	-	0.11
Euro, Aust, Far East MSCI-p	1145.8	+	4.4	+	0.39
Frankfurt DAX	2427.07	-	6.84	-	0.28
Hong Kong Hang Seng	11364.46	+	164.27	+	1.47
Johanesburg J'burg Gold	1747	+	34	+	1.98
London FT 30-share	2738.7	-	10	-	0.36
London 100-share	3745	-	2.6	-	0.07
Madrid General Index	330.7	-	0.23	-	0.07
Mexico I.P.C.	2971.25	+	50.53	+	1.73
Milan MIBtel Index	9713	-	365	-	3.62
Paris CAC 40	1956.38	-	26.95	-	1.36
Singapore Straits Times	2401.79	-	20.88	-	0.86
S. Korea Composite	869.98	+	11.8	+	1.38
Stockholm Affarsvariden	1819	-	6.1	-	0.33
Taiwan DJ Equity Mkt	119.39	-	0.35	-	0.29
Tokyo Nikkei 225 Average	20943.59	+	159.36	+	0.77
Tokyo Nikkei 300 Index	302.36	+	1.53	+	0.51
Tokyo Topix Index	1617.41	+	7.18	+	0.45
Toronto 300 Composite	50059.69	+	14.38	+	0.29
Zurich Swiss Market	3266.1	+	6	+	0.18

p-Preliminary na-Not available

Pension funds or passive approach investors, on the other hand, prefer to use the MSCI, FT or other international indexes for the following reasons:

(1) Pension funds do not need up-to-the-minute indexes.

(2) The indexes on all stock markets are available in a central location.

(3) All MSCI or FT indexes are calculated in a single consistent manner, allowing for direct comparisons between markets.

The choice of index is important. Although they are highly correlated, the difference in performance between two indexes for the same market can be significant by as much as several points.

Example XI.3: In Graph XI.1 we plot two widely used market value-weighted German stock indexes from December 1987 to December 2011. The pink line represents the MSCI index and the blue line is the DAX index.

GRAPH XI.1 Local vs. International Index



In general, both indices move together, but not always. For example, in April 2000 there is slight departure from the usual co-movement between the two EUR denominated indices. \P

• What's in the Index?

The Nikkei 225 is Japan's most widely used index. This index is not a very reliable index. The Nikkei 225 has many failings as a true indicator of market value.

The Nikkei 225 is practically unweighted, calculated by adding up the individual stock prices and dividing by 225. The result means that Shimura Kako, a specialized nickel alloy processor with 29 employees and sales of USD 100 million, has the same weighting as Toshiba, the electronics giant that employs 67,900 staff and generates sales of USD 32,000 billion. This lack of weighting has significant implications. It makes it easy for the government or private institutions to manipulate the index. They need only buy or sell small quantities of low liquidity stocks to drive the index up or down. This is important, given the volume of trading in Osaka and Singapore of Nikkei 225 futures.

The Nikkei 225's constituents have barely changed since it was set up in 1950. The rules governing the index emphasize the need for continuity, therefore, the 225 represents the Japan of the 1950s and 1960s. The obsession with continuity has excluded 17 of the 50 largest stocks on the first section of the Tokyo Stock Exchange from the Nikkei 225. Maruzen, a bookseller with sales of USD 123 million is in the Nikkei 225, but Ito-Yokado, Japan's second biggest retailer with sales of USD 13,000 million and eight largest capitalized stock on the market, is not in the Nikkei 225.

It is true, that rules have been introduced in 1991 that permit stocks to be expelled on the grounds of low liquidity, rather than simply bankruptcy or merger. But since 1993, only one company -Japan Wool of Textile- has been withdrawn for liquidity. The liquidity criteria for inclusion leads to some strange entrants. For example, Asahi Bank entered the 225 in 1998, but not its bigger rivals

Industrial Bank of Japan and Tokai Bank. One European broker suggested that Asahi's entry might reflect the better than expected performance of Asahi.

The Nikkei has responded to these criticisms by creating the Nikkei 300 index, which is weighted and its constituents are based on market capitalization. **Source**: Financial Times, October 19, 1998.

1.C Stock Index Futures and Options: Hedging Market Risk in International Markets

In Chapters VI to VIII we studied different hedging techniques. Our goal, in those chapters, was to hedge currency risk. Now, we will learn how to use stock index futures and options to hedge the risk in a well-diversified portfolio.

1.C.1 <u>Stock Index Futures</u>

In the Review Chapter we studied that the relation between the return on a portfolio of stocks and the return on the market can be summarized by β . When $\beta=1$, the return on the portfolio tends to change one-on-one with the market. When $\beta<1$ ($\beta>1$), the excess return on the portfolio tends to be smaller (greater) that the excess return on the market.

Suppose we want to hedge against changes in the value of a portfolio during a period of time, T-t. Define

r_p: return of USD 1 invested in the portfolio.

- r_m: return of USD 1 invested in the market index.
- S_t : current value of the portfolio.
- Ft: current value of one index futures contract at time t.
- *N*: Optimal number of contracts to short when hedging the portfolio.

The value of one contract, F_t , is the futures price multiplied by the contract size. In the case of the S&P 500 futures contract, one contract is on 250 times the index. That is, USD 250 per full index point. In the case of the FT-100, traded in LIFFE, one contract is on GBP 25 times the index.

Example XI.4: On November 24, 1995, the *Financial Times* published the following futures quotes for the FT-SE 100 index.

FUTURES AND OPTIONS

FT-SE 100 INDEX FUTURES (LIFFE) 25 per full index point

	Open	Sett price	Change	High	Low	Est. vol	Open Int.
Dec	3463.0	3610.0	-34.0	3643.0	3605.0	5269	64944
Mar	3663.0	3634.0	-33.5	3663.0	3634.0	685	8971
Jun		3640.0	-34.0			0	134

For example, the value of the Dec 1995 FT-SE 100 futures contract is GBP 25 x 3610.0 = GBP 90,250.

From the definition of β , it is approximately true that

 $r_p = \alpha + \beta r_m$,

where α is a constant. The change in the value of the portfolio between times t and T is Sr_p or

 $S \alpha + \beta S r_m$.

The change in the value of one futures contract price during this time is approximately Fr_m . The uncertain component of the change in the value of the portfolio is therefore approximately $\beta xS/F$ times the value of one futures contract. Therefore,

 $N = \beta x S/F.$

♦ Zero beta, but there is still risk

This hedge creates a situation where the stock position is indifferent to changes in the market portfolio. That is, the beta has been reduced to zero. Risk, however, exists as long as the underlying position does not perfectly correlate with the market index. ◆

Example XI.5: On November 24, 1995, Mr. Hill, a U.S. portfolio manager, has invested GBP 4 million in a U.K. mutual fund. He feels very comfortable with the medium and long-run perspectives of the U.K. stock market, but he forecast that the U.K. market will not do very well in the next four months. He decides to hedge the U.K. position using a March 96 FT-SE 100 index futures contract. The current futures price (see Example XI.4) is 3663.0 and the ß of his portfolio is 1.3. The value of one futures contract is GBP 91,575. The number of futures contracts to short is

 $N = 1.3 \times 4,000,000/91,575 = 56.78$ (or 57 contracts.) ¶

A stock index hedge, if effective should result in the hedger's position growing at approximately the risk-free interest rate (in Example XI.5, the U.K. risk-free interest rate).

1.C.1.i Changing Beta

Stock index futures can be used to change the beta of a portfolio. Consider the situation in Example XI.5. To reduce the beta of the U.K portfolio from 1.3 to 0, we needed to sell 56 contracts. To reduce the beta to 1.0, it is necessary to short (56.78 - 43.68) 13 contracts; to increase the beta from 1.3 to 2.6 a long position in 57 contracts is needed; and so on.

In general, to change the beta of the portfolio from β to β^1 , where $\beta > \beta^1$, a short position in

 $(\beta - \beta^1) \ge S/F$

contracts is needed. When $\beta < \beta^1$, a long position in

 $(\beta^1 - \beta) \ge S/F$

contracts is needed.

1.C.2 Stock Index Options

The value of a stock index options is equal to the stock index price multiplied by the contract size. In the case of the S&P 500 index option, traded at the CBOT, the contract size is USD 100. The S&P 500 stock index option is European. The S&P 100 stock index option, also traded at the CBOT, has a contract size of USD 100 and it is American. LIFFE trades stock index options on the FT-SE 100 index. LIFFE offers American and European contracts. The contract size for the FT-SE 100 is GBP 10. All contracts are settled in cash.

Stock index options are routinely used to hedge market risk. For example, put options are used to buy portfolio insurance. We will derive the number of contracts needed to buy portfolio insurance.

Suppose a manager decides to put a floor on the value of her portfolio. Assume that the value of her portfolio is perfectly correlated with the stock index.

Notation: S_t = value of portfolio, Index_t = Value of the index at time t, N = number of options, Floor_t = floor on the value of portfolio set at time t, X = strike price, m = contract size (multiplier), p = option's premium.

Given the above assumptions, we have that

 $S_t = a + b Index_t$.

If at time T, the index is lower than X (Index_T < X), the manager wants to select *N* such that the value of the new portfolio -i.e., value of S_t plus the value of N options- is never lower than the floor. That is,

b Index_T + N m (X-Index_T) - N m p \geq Floor_t.

The first term represent the value of the portfolio at time T. The second term represents the value of the N put options in-the-money at time T. Finally, the third term represents the cost of the N put options.

The goal of the manager is to select N. Now, we rewrite the above equation as:

 $(b - N m)Index_T + N m (X-p) \ge Floor_t.$

Note that if (b - N m)=0, then the value of the portfolio is independent of market fluctuations at time T. That is, Index_T has no influence on the value of the portfolio. Therefore,

N = b/m.

If $Index_T < X$, the options expire worthless and the value of the overall portfolio is:

b Index_T - N m p \geq Floor_t.

If the portfolio and the market index are not perfectly correlated, the use of index options only provides partial insurance. In this, more realistic, case we should adjust N by the beta of the portfolio. That is, the number of contracts used to hedge market exposure is given by: $\beta \ge b/m$.

• Futures and Options Hedge against the Market

The portfolio is insured against movements on the market, not against movements of the stocks in the portfolio. \blacklozenge

Example XI.6: It is January 2, 1997. Today, the FT-SE 100 closed at 4060. Ms. Howe manages a British portfolio valued at GBP 12 million. Ms. Howe's portfolio has β =.93. She is concerned about a possible drop of the British market during the next two months. She does not want the value of her portfolio to drop below GBP 10 million. That is, Ms. Howe is interested in buying insurance such that the floor for her portfolio is GBP 10 million. She decides to use FT-SE 100 index put options to establish this floor. On January 3, 1997, the March put option with a strike price of 4,000 is trading at 69. That is, the cost of each contract is: 69 x GBP 10 = GBP 690.

Using historical data, Ms. Howe has estimated that b = 2790.

Ms. Howe wants to determine the number of options to hedge her exposure.

N = .93 x 2790/10 = 259.47

Now, we want to check if the floor really works. Suppose that in March, $Index_M = 3,500$.

Then the value of her portfolio is:

 $N \text{ m} (X-\text{m} p) \ge \text{Floor}_t.$ 259.47 x 10 (4000 - 69) = GBP 10,199,765.70 \ge Floor_t = GBP 10,000,000.

If in March, $Index_M = 4500$, then 2790 4500 - 259.47 x 10 x 69 = GBP 12,375,965.70 \geq Floor_t = GBP 10,000,000.

The total cost of this floor is GBP 690 x 259.47 = GBP 179,034.30 (\approx 1.50% cost relative to amount insured).¶

II. Market Microstructure

2.A <u>Basic Organization</u>

The typical organization for a stock market is the *private stock exchange* model. Private stock exchanges are founded by independent members for the purpose of trading securities. A typical example of the private stock exchange is the New York Stock Exchange (NYSE). There might be several private stock exchanges in a country and they may compete with each other. The multiple private stock exchange structure is observed in the U.S., Japan, and Canada. In other countries, like the U.K., Mexico, and Taiwan, one leading exchange has emerged through either attrition or absorption of its leading competitors.

The exchanges are private, but they are subject to public regulation. The mix of self-regulation and government supervision is oriented more toward self-regulation. Private exchanges often require members to perform all of their transactions on the floor of the exchange. Commissions are either set by the exchange or imposed by the public authority. In many countries, commissions are fully negotiable.

Another organizational model for stock exchanges is the *public stock exchange*. This structure was created in France, using the Napoleon legal code. This structure gives the brokers, who are appointed by the government, a monopoly over all transactions. Brokerage firms are private and new brokers are proposed to the state for nomination by the broker's association. Many European stock exchanges were organized under this model. The stock exchanges of Paris, Athens, and Madrid, among others, used this model.

Some countries have organized their stock exchanges around banks. Under the *bankers stock exchange*, banks are the major securities traders. The SWX Swiss Exchange is a typical example of a bankers exchange. The seventy-six members of the SWX are all banks, a quarter of them foreign. Some of the members are "remote members." These remote members are foreign banks with no physical presence at the exchange. Bankers exchanges may be either private or semipublic organizations. Bankers exchanges are found in the German sphere of influence: Austria, Switzerland, and Scandinavia.

During the last twenty years, deregulation and competition from other stock exchanges have progressively affected all public exchanges. Today, the majority of the exchanges have been reorganized following the private stock exchange model. For example, the Borsa Italiana S.p.A., the group leader and responsible for the organization and management of the Italian stock exchange. The company, founded in 1997 following the privatization of the exchange, is responsible for defining and organizing the functioning of the markets; defining the rules and procedures for admission and listing on the market for issuing companies and brokers; managing and overseeing the market; supervising the listed companies' disclosure. The Borsa Italiana's primary objective is to ensure the development of the managed markets, maximizing their liquidity, transparency and competitiveness and at the same time pursuing high levels of efficiency and profitability.

• Privatization of a Stock Exchange: The Athens Stock Exchange

The Athens Stock Exchange (ASE) was established in 1876, by the issuance of the first Stock Exchange Law based on the French Commercial Code. Stock Exchange began to operate as a self regulated public institution. Later, in 1918, Law 1308 set up ASE as a public entity

In early 1994, a series of laws were approved to modernize the ASE. In 1995, Law 2324 transformed the ASE into a joint stock company, supplemented the listing regulations, allowed over the counter (OTC) transactions and short selling (under specific circumstances). The Law 2324 defined the conditions for the disposal of shares through private placement, broadened the scope of activities of brokerage companies, allowed remote brokering, deregulated commissions and introduced amendments to the Capital Markets Commission regulations. Finally, in 1997, Law 2533 provided the legal framework for the privatization of the ASE. The same Law created three new markets, the derivatives market, the parallel market for emerging markets and the market for fixed income securities.

Today, the ASE is owned by a holding company called Hellenic Exchanges S.A. (HELEX) established and listed on ASE in March 2000. ◆

A more recent development is the transformation of many exchanges --e.g., the Paris Bourse, Deutsche Börse, Athens Stock Exchange (ASE) and Australian Stock Exchange (ASX)-- into business organizations. They are adopting corporate-type ownership and governance, segmented markets and performance-driven organizational structure and culture. For example, on March 15, 2000, the London Stock Exchange's (LSE) shareholders voted to demutualize and, thus, enable the exchange to become a public company. A month later, shares of LSE started to be traded at the LSE. In March 2006, the NYSE also went public, trading under the tick symbol NYX.

On December 6, 2002, the Chicago Mercantile Exchange (CME) -the largest U.S. futures exchangelisted on the NYSE, becoming the first U.S. financial market to go public. Similarly, in 2005, the Chicago Board of Trade (CBOT), also went public.

Exchanges are competing for listings with one another like businesses. Competition and technological change have created the conditions for consolidation and cooperation agreements in the stock exchange industry around the world. Since the late 1990s, there has been a big wave of consolidation among stock exchanges.

In June 1999, the four French market operators (SBF, Matif SA, Monep SA, and Société du Nouveau Marché) merged to form a single entity, Paris Bourse. Later, in September 2000, the Amsterdam Exchange (AEX), the Brussels Exchange (BXS) and the Paris Bourse merged to form the first European exchange Euronext N.V. Euronext became the first fully integrated cross-border single currency stock, derivatives and commodities market. In January 2002, Euronext acquired the London International Financial Futures and Options Exchange. Almost immediately, in February 2002, Euronext merged with the Lisbon Stock Exchange (BVL). Years later, in May 2006, NYSE agreed to buy Euronext NV for USD 10 billion. This purchase created the first transatlantic stock market, which became NYSE Euronext. In 2008, NYSE Euronext but the old American Stock Exchanges for USD 260 million in stock.

In January 1998, Stockholmsbörsen (OM) and the Copenhagen Stock Exchange (KFX) signed a cooperation agreement to form NOREX, a common Nordic equity market. Although the OM and the KFX remain independent, they allow cross-membership and use a single buy-and-sell order book for each security. NOREX has also adopted common trading rules and a uniform trading platform,

SAXESS -Stockholmsbörsen's trading engine. In 2000, the Iceland Stock Exchange (ISX) and the Oslo Exchange joined NOREX. In another Nordic consolidation move, in September 2003, the OM and HEX (Helsinki Exchanges) merged and formed OMX group. Immediately, OMX bought KFX for DKK 1.2 billion. In 2006, OMX also bought ISX for SEK 250 million. On February 27, 2008, after long and complicated negotiations also involving LSE and the Dubai Burse, OMX was purchased by NASDAQ. The expanded NASDAQ was renamed the NASDAQ OMX group. In 2011, NASDAQ OMX tried to buy NYSE Euronext for USD 11.2 billion. NYSE's board twice rejected the NASDAQ OMX's unsolicited offer in favor of a European Commission blocked merger with Deutsche Boerse.

In 2007, the biggest deal in a global consolidation of the financial exchanges was the blockbuster merger which saw Chicago Mercantile Exchange Holdings buying its smaller rival CBOT Holdings Inc. for about USD 8 billion, giving the new company a then record book value of USD 26 billion. These deal followed the decision by the CME and the CBOT to go public. Previous attempts at merging had been stonewalled by floor-traders, who once owned both exchanges. The new entity was renamed CME group. Two years later, in August 2008, CME group bought NYMEX Holdings for USD 8.9 billion.

In December 2007, the Toronto Stock Exchange (TSX Group) agreed to merge with the Montreal Exchange (MX) in a CAD 1.3 billion deal that created an integrated, multi-asset class execution venue for equities and derivatives in Canada. Toronto was the main cash equities market, while Montreal was the main derivatives market in Canada.

Trying to keep up with NYSE's expansion, LSE has had its share of acquisitions and attempted mergers. In 2007, it acquired Milan-based Borsa Italiana fro USD 2.5 billion, though, LSE agreed to keep the two exchanges separated, and MTS (Mercato dei Titoli di Stato), the Italian fixed income exchange. In 2011, LSE agreed with Canada's TMX to a USD 3 billion all-share merger, but TMX shareholders did not agreed to the deal.

2.B <u>Differences in Trading Procedures</u>

Besides the legal environment, numerous differences are found in the operation of national stock markets. The most important differences are in the trading procedures.

2.B.1 Cash versus futures markets

The terms *cash* and *forward* refer to the settlement of stock exchange transactions. An investor buys securities and the seller sells securities, but the buyer will have to pay for the securities she bought and the seller will have to deliver the securities he sold. On both markets, this settlement is executed in a different way. On the cash market, an executed order has to be settled soon after the execution of the order. For example, at the NYSE, transactions must be settled in three days after execution. This means the investor has a maximum of three trading days to pay/deliver the securities traded on the NYSE. On the forward market, all orders of the same fortnightly period are executed soon after

the closing of this fortnightly period. For example, at the Brussels Stock Exchange (BXS) forward transactions are settled within four days of the carry over day.

Most stock exchanges are organized as cash markets, and transactions must be settled within a couple of days. In some countries, such as Germany and Japan, trading in forward and futures used to be explicitly forbidden.

To allow more leveraged investment, margin trading is available on many cash markets such as those of the U.S., Canada, Japan, and Switzerland. In margin trading, the investor borrows money from a broker to finance a transaction. Margin trading, however, is costly compared to trading on an organized futures market because private contracts must be arranged for each deal. This is still a cash market transaction and delivery of the shares takes place immediately; however, a third party steps in to lend money (shares) to the buyer (seller) to honor a cash transaction commitment.

In contrast, futures or forward stock markets provide an organized exchange for levered stock investment. The Paris Bourse is an example of a forward market. A deposit is required to guarantee a position, as on most forward markets. Some of these forward stock markets, such as those in Rio de Janeiro and the Far East, have sprung up quite recently as competitors to old cash stock markets.

Some stock exchanges have both forward and cash markets. For example, at the Brussels Stock Exchange (BXS) large firms are traded on a forward market basis, while medium and small firms are traded on a cash market basis. That is, the BXS market is split up into two segments on the base of the liquidity or the negotiability.

2.B.2 Fixed versus continuous quotation

U.S. investors are accustomed to a *continuous* market, where transactions take place all day and where large *market-makers* assure market liquidity at virtually any point in time. In some markets, the market maker has a monopoly for a given security, as is the case for the *specialist* on the NYSE. In other markets, the market makers, also called *dealers or jobbers*, compete with one another. An example of a dealership market is the London Stock Market. The client will turn to the market maker who provides the best bid-ask quote. Market makers adjust their quotes continuously to reflect supply and demand conditions.

In other countries, an asset is traded only a few times per day and its price is determined through a competitive auction system. This is known as a *call* or *fixing* market, where a single price applies to all transactions. The call system is used in markets where there is not enough liquidity to support a continuous system. In most of the continuous markets, a call auction system is used to determine the opening price at the start of the sessions (for example, Tokyo Stock Exchange, NYSE, and Buenos Aires Stock Exchange).

The increased volume of transactions as well as computerization has made continuous trading easier to implement. The 1990s wave of modernization of stock exchanges around the world has caused the pure call systems to disappear. The Tel-Aviv Stock Exchange (TASE) abandoned the pure call system by the end of 1997, and replaced it with an electronic continuous trading system. In many

markets we find a mixture of call and continuous trading. The Wiener Börse (Vienna Stock Exchange) uses the continuous system for the most active securities, while a call system is used for the less active securities. Similarly, the BSX offers two price fixings ("semi-continuous system") a day for the less liquid stocks.

2.B.3 Computerization

An important component of the modernization of trading systems implemented by most of the exchanges around the world has been a change toward a higher degree of automation. Trading on a floor where participants noisily meet is progressively being replaced by computerized trading.

At the NYSE and other exchanges, floor traders, however, execute all the orders, according to a set of rules, specified by the exchange. This set of rules can easily be entered into a computer program and an electronic exchange is born. Thus, in an electronic exchange, the need for floor traders disappears. In the simplest form of an electronic exchange, when bid and offer prices match, orders automatically execute against one another on screen, bringing increased speed and efficiency to the market. It has been shown that electronic exchanges deliver significant cost savings to investors. At the LSE, an independent study by The Plexus Group has shown that, since the introduction of the electronic order book (STS), the cost of trading for institutions in the U.K. equity market has more than halved, from an average of 60 basis points to 25 basis points.

A trade execution function is an algorithm that performs order matching according to a set of rules governing priority of submitted bids and offers. The priority rules determine the place of a bid or offer in the queue awaiting execution. A match occurs under several circumstances, depending on the design of the system. The best price is the highest priority on almost all systems. Almost all systems have a time priority, which means first in, first out. Time, however, refers to time at a particular price, not time in the system. Some systems also have priorities based on size, order type, trader class, display, etc.

There are several examples of completely automated trading systems. The Computer Assisted Trading System (CATS) developed by the Toronto Stock Exchange (TSE) allows the automated execution of orders entered by traders in their office. It is a system well adapted to auction markets without market makers, and CATS has been adopted by many foreign markets (Paris, Tokyo, Madrid, Taiwan, etc.). The CATS system eliminated the need for a floor where participants meet. Several markets have adapted the CATS system to their special needs and/or priorities. The improvements made by the Paris Bourse to CATS, renamed CAC, were so attractive, that in 1996 the TSE bought the Paris Bourse's CAC system. The new TSE system now is called TOREX.

In the U.S., the National Association of Security Dealers has developed an electronic system known as SOES, which allows the electronic execution of small orders. The SOES system works alongside the trading floor. In London, in October 1997, the electronic order book (STS) was introduced to replace a competing quote-driven market maker system. The order book includes the FTSE 100, the most liquid FTSE 250 securities, equities that have a LIFFE traded equity option and Irish stocks traded in euro. London has implemented a NASDAQ-type system called SEAQ, which also allows the electronic execution of small orders and non-STS transactions. The SWX Swiss

Exchange has developed the first electronic trading platform, which integrates trading, clearing and settlement. A single mouse-click initiates trading, payment, settlement and confirmation.

In Table XI.3 we present a list of the main fully automated stock and bond exchange.

System (exchange)	Date	Hours	Securities	Country
SEATS (ASX)	1987	Day	All ASX listed stocks	Australia
TOREX (TSE)	2000	Day	All TSE listed stocks	Canada
MORRE (ME)	1990	Day	All stocks	Canada (Quebec)
SAXESS (NOREX)	1999	Day	Listed CSE and SSE stocks and bonds	Denmark, Sweden
CAC (Paris)	1986	Day	All stocks, most bonds	France
XETRA (FWB)	1997	Day	All stocks, 370 bonds, 23 warrants	Germany
HKTS (SEHK)	1993	Day	SEHK listed stocks	Hong Kong
GTB (Milan)	1991	Day	Most stocks	Italy
CORES (TSE)	1982	Day	TSE listed stocks	Japan
STS (OSE)	1991	Day	1,099 OSE stocks	Japan
SENTRA Capitales (BMV)	1996	Day	Listed stocks, bonds	Mexico
CLOB (SSE)	1987	Day	SSE, HK listed stocks	Singapore
SIB (SSE)	1991	Day	116 stocks	Spain
SWX (SWX)	1995	Day	All securities	Switzerland
STS (LSE)	1997	Day	most liquid listed stocks	UK
BEACON (BSE)	1987	Day	Stocks trade over ITS	USA
NSTS (CSE)	1985	Day	425 stocks (2,700 capability)	USA
MAX (MSE)	1981	Day	Exchange listed stocks	USA
ABS (NYSE)	1976	Day	Bonds	USA
OHT (NYSE)	1991	Night	NYSE stocks	USA
SCOREX (PSE)	1969	Day	Listed stocks	USA
PACE (PHLX)	1976	Day	Listed stocks	USA
MAX-OTC (MSE)	1987	Day	OTC stocks	USA
OLS (NYSE)	1986	Day	Odd lots for NYSE listed stocks	USA
SOES (NASD)	1985	Day	NASDAQ stocks	USA

 TABLE XI.3

 Some automated stock and bond exchanges

There are more than 50 automated systems that trade stocks, futures and options. These can be classified according to the degree in which the price discovery process has been automated. Ian Domowitz, in a paper published in the <u>Journal of Financial Services Research</u> in 1992, describes seven levels of automation.

vi. Level 1: Exogenously determined prices.

These are systems, which determine their transaction prices by taking them directly from a trading floor or telephone market operating in tandem. Though trade matching is still executed according to time and order priorities, the price discovery system per se cannot be considered as automated. SOES is an example of this type of level of automation.

ii. Level 2: Exogenously determined prices with price improvement algorithm.

In these systems, transaction prices are also taken from a trading floor. A computer code, however, assesses market conditions and assigns improved prices. The treatment of stopped orders in the Midwest Stock Exchange's Enhanced SuperMax rules can be presented as an example since stopped orders are assigned different prices than the stop price, depending on expected price movements in the NYSE.

iii. Level 3: Systems with negotiation capability.

Some automated systems allow traders to advertise their quantities without price specification in order to motivate negotiation. SOFFEX, the electronic system of the SOFFE (Swiss Options and Futures Exchange), presents this level of automation.

iv. Level 4: Direct removal of quotes from the trading screen.

A trader, upon observing the bid-ask prices on the screen or the limit order book can access a trade by pushing a button, executing the transaction at the best quote available on the screen. Orders are not saved for a later execution at a different price. The GLOBEX system of the CME and the APT system of the LIFFE are examples of this degree of automation.

v. Level 5: Automated continuous double auction.

Bids and offers are submitted in a continuous manner, transactions occurring when the orders cross. The price discovery process is completely endogenous, within the context of certain priority rules. These rules are set according to time, quantity, order type, and trader classification. The Madrid Stock Exchange's electronic market is an example of this level.

vi. Level 6: Automated periodic single-price auction.

Bids and offers are accepted over some time interval and are then simultaneously executed at one price. The execution price is calculated as the price that maximizes total trading volume. This system is used by many of the automated continuous double auctions in order to determine their opening prices. This system provides a very high degree of automation, since there is less human interaction in the price discovery process. The price setting procedure only determines whether an order will be executed and does not affect the probability of it being executed, as does a continuous system which accepts limit orders and prioritizes them according to their prices. The SOM system of the Swedish Options Market offers this level of automation.

vii. Level 7: Automated auction with pricing model.

These systems match orders according to criteria other than price. The justification being that prices may in fact not reflect changes in the underlying value of fundamentals, thus becoming "stale." The SYCOM system of the SFE (the Australian Futures and Options Exchange) is an example of this level of automation.

Domowitz also compares different automated and non-automated systems. He concludes that automated trading systems exhibit less price volatility and a faster decline of standard deviation with respect to market size. Liquidity, the size of the bid-ask spread, and depth (market's ability to absorb quantity without an appreciable effect on price) seem to improve with automation. The introduction of the SWX Swiss Exchange integrated electronic platform reduced the size of the bid-ask spread for blue chips from .2% to .15%.

A higher degree of automation also has an impact on transparency and anonymity. Several authors claim that the anonymity provided by automated systems is one of the main reasons for the success of the off-exchange computerized trading systems currently competing against the NYSE (for example, Instinet, Posit and Spaworks). The same reason is cited behind the implementation of a London based off-exchange trading system.

As a result of the efficiency and transparency gains of electronic trading systems and the increased international competition in the stock exchange industry, many stock exchanges have become floorless exchanges. For example, the ASX (1990), Kuala Lumpur Stock Exchange (1992), the Paris Bourse (1995), the Johannesburg Stock Exchange (1996), the Korean Stock Exchange (1997), the Bombai Stock Exchange -Mumbai- (1997), and the Toronto Stock Exchange (1997) have chosen to close the trading floor and became fully automated exchanges.

• The End of an Era

After 90 years of floor trading, on January 8, 1999, the last open outcry transaction ("viva voz" transaction) was carried out in the floor of the Bolsa Mexicana de Valores (BMV), the Mexican stock exchange. From January 11 on, all transactions are carried out through the computerized system BMV-SENTRA Capitales. BMV-SENTRA Capitales is a totally decentralized and automated system, which allows users to perform trades in real time through hundreds of computer terminals interconnected by a network. The terminals are located in brokerage firm offices and controlled by the Trading Control station at BMV. Transactions are closed or entered through on-screen formats specifying issuer, series, amount and price of the securities the user wishes to buy or sell.

A broker must send orders from the broker's headquarters to the Bolsa's central order book via the electronic trading system for equities or BMV-SENTRA Capitales, where they are matched when a similar but opposite order is received. •

2.C Internationalization

To service international investors, securities firms have developed an international network of offices. These networks provide an expensive medium for domestic investors to reach foreign markets. A cheaper alternative for investors is to be able to access from their domestic markets other international markets. With the advanced computerization of the major exchanges, accessing foreign markets is very easy. There are no real technological impediments for cross-border automated trading. The SWX Swiss Exchange allows its remote members to use the SWX electronic platform from their home base. Xetra, the electronic platform of the Deutsche Börse, also takes orders from any point in the globe, which then are automatically inputted into the order book on the central computer.

Linkages of stock markets around the world (and around the clock) are becoming serious alternatives. The main problem for linking national stock markets is the different sets of rules that governed each market. Harmonization of trading rules and procedures is a tool that many stock exchanges are using to become more competitive. In 1998, the OM Stockholm Exchange (OMX) and the Copenhagen Stock Exchange (KFX) signed an agreement covering a common Nordic exchange, NOREX. The OMX and KFX have thus implemented a cross-border trading system and a common set of trading rules. The NOREX gives access to 80% of the Nordic equity market via one joint electronic trading system, the SAXESS. The NOREX has expanded to include the Oslo Stock Exchange (November 1999) and the Iceland Stock Exchange (March 2000).

In another example of linking different exchanges through a single trading platform, the Paris Bourse, the AEX Amsterdam Exchange, and the BXS Brussels Exchange in March 2000 formed Euronext, an integrated European stock exchange. Although the different jurisdictions and local licenses of the individual exchanges are maintained, Euronext provides a single operating umbrella for all three exchanges. Trading is centralized, and a uniform trading platform—the Paris Bourse's NSC trading engine—is used, allowing a single trade price to be established. Shares are listed at a national level and companies can select their trading venue from among the three exchanges.

True cross-border automated trading is also provided by the EURO.NM and by the EASDAQ. The EURO.NM (NM stands for New Market) is a new stock exchange created to attract young, high growth companies. The new market is a pan-European network of stock markets, with five members: AEX Amsterdam Exchange, BXS Brussels Exchange, Deutsche Börse, Paris Bourse, and Borsa Italiana. At the end of 1999, there were over 300 companies listed on the EURO.NM, with a total market capitalization of over EUR 60 billion.

Competing with EURO.NM to attract high growth companies, the European Association of Securities Dealers Automated Quotation (EASDAQ) offers a truly European stock market, governed by a single legal system and subject to a single supervisory structure. EASDAQ is a screen-based, quote-driven market, which uses a multiple market maker system similar to that used by NASDAQ in the United States. EASDAQ has its own dedicated trading platform, which allows seamless trading and settlement across the European Union. Trading on EASDAQ takes place through EASDAQ's European members, currently situated in the U. K., France, Germany, the Netherlands, Switzerland, Austria, Belgium, Portugal, Italy, Denmark, Finland, Greece, and Luxembourg. By the end of 1999, the EASDAQ had over 50 companies listed, with a market capitalization of over EUR 20 billion.

The best global reach is provided by INSTINET, which has terminals located around the world. INSTINET is a proprietary automated trading system owned by Reuters.

• Exchange of the Future

Some experts believe that the best method would not be to join cooperative agreement with other markets, but that stock exchanges should simply make their own automated trading system available (i.e., cross-border automation) worldwide on a 24-hour basis. To be attractive, such a system requires round-the-clock market makers and sufficient liquidity. Efficient clearing and settlement procedures are also needed. \blacklozenge

III. Practical Aspects

3.A <u>Dual-Listing</u>

Multinational companies such as IBM or Sony are traded on many exchanges. The listing of the same company in different exchanges is called dual-listing or cross-listing. Many European exchanges have a large proportion of foreign listed companies. In 1998, Germany and Luxembourg had more foreign companies listed than domestic companies. cross-listings have become increasingly common in the U.S. For example, by the end of 1998, at the NYSE the number of foreign listed companies grew to 391. This number represented nearly 170 more foreign companies than at the beginning of 1996.

The procedure for admitting foreign stocks to a local market varies. In some markets the regulations are quite lax. For example, as of 1986 the Quebec Securities Act allowed a foreign company to be listed in Montreal simply by meeting the same regulatory requirements as those in its own jurisdiction. In other markets, like the U.S., cross-listing means that foreign companies must satisfy the local exchange and other regulatory requirements (which might be costly, for example, producing quarterly reports in English).

Multiple listing implies that the share values of a company are linked on several exchanges. One company should sell at the same share price all over the world, once adjustments for exchange rate and transactions costs have been made. Arbitrage among markets ensures that this is so.

There are several reasons for being listed on several national markets. Cross-listings allows investors from around the world to enjoy the benefits of international diversifcation by investing in a foreing company. Greater market demand improves liquidity for the shares and might improve performance. Entrenched management might like to have a diversified ownership, and, thus, reduce the risk of a domestic takeover. Listing in international markets is a good advertising tool, especially for emerging market companies. Cross-listing is also a signal that the company complies with disclosure standards and good accounting practices.

Double-listing has disadvantages. Foreign ownership might not be welcome by the local government or by domestic residents and investors. The main disadvantage of dual listing, however, is increased volatility.

Example XI.7: Bad political news in Chile has frequently been followed by an immediate outflow of international capital, driving domestic share prices down in this illiquid stock market. Chilean shareholders display less volatile behavior than foreign investors for two reasons: they are not as surprised by bad domestic news; domestic controls and regulations give them few attractive investment alternatives. ¶

• Restricting Foreign Ownership

Many governments in both developed and developing countries often impose restrictions on the maximum proportionate ownership of local firms by foreigners. In countries like India, Thailand, and Mexico, for example, foreigners are allowed to control at most 49% of the outstanding chares of local firms. In Switzerland, a local firm can issue two different classes of equity shares, bearer and registered shares. Foreigners are often allowed to buy only bearer shares; only Swiss nationals are eligible to buy registered shares. Chinese firms issue A share and B shares, and foreigners are allowed to hold only B shares. \blacklozenge

3.A.1 <u>American Depositary Receipts (ADRs)</u>

In countries such as the U.S., the U.K., India, Singapore, and The Netherlands trading takes place in special shares of the foreign company, depository receipts (DRs). Specifically, U.S. investors deal in American depository receipts (ADRs). Depository receipts have been around since 1927, but their popularity took off in the 1980s, propelled by investors globalizing their portfolios, and emerging markets companies turning to the DR product in deregulated U.S. markets. European DRs were created to be traded in London, Singapore DRs are traded in the Singapore Stock Exchange, and the Continental DRs are traded in The Netherlands. More recently, the Global DRs (GDRs) were created to meet the needs of European settlement systems (Cedel and Euroclear). DRs are denominated and pay dividends in the domestic currency. They have become the most popular vehicle for foreign companies to raise funds in the U.S. We will concentrate on the ADR market, which is by far the largest.

As mentioned above, ADRs have a long history in the U.S. stock market. ADRs were invented by a predecessor of Morgan Guaranty Trust Company of New York in 1927. These ADRs gave U.S. residents the opportunity to invest in foreign securities without suffering the illiquidity and dividend conversion expenses of direct foreign ownership. Initially, ADRs offered additional advantages: reduction of the delay in transporting stock certificates, faster settlement and registration of securities. The first ADR account to open was Selfridge Provincial Stores Limited. Another 17 ADR accounts were opened around that time, three of them still survive: BAT Industries, Cortlaulds plc, and The General Electric Co. plc. After the establishment of the original 18 ADR accounts, there were no new ADRs created until 1955.

Note that by trading in ADRs a U.S. investor avoids the delays of trade settlement, the problems associated with safeguarding the foreign stock certificates, and making currency transactions. No additional tax burden is carried.

Investment in ADRs is based on the performance of the underlying equities and their home markets and home currency. The market value of an ADR reflects the current rate of exchange between the U.S. and a foreign country and, taking transactions costs away, they trade at the same price that in the foreign country. Trading on ADRs does not eliminate currency risk or country risk.

Example XI.8: If the British pound depreciates sharply, British Airways dollar returns will decrease, and therefore, British Airways ADRs, trading in NYSE, will decline. Similarly, if there is political turmoil in South Africa, it will be reflected in the DeBeers ADRs, which trade in NASDAQ. ¶

In 1995, there were more than 1,800 ADR programs available to U.S. investors, with a combined market value of over USD 50 billion, representing companies from 58 countries. Originally created to foster investment in European companies, ADRs came to be dominated by emerging market companies. Therefore, even though most of the ADRs are large capitalization issues, there are an increasing number of small capitalization issues, especially from Latin American countries.

The increasing number of ADR programs available to U.S. investors has been reflected on the trading volume of U.S. equity markets. In 1991, purchases and sales of non-U.S. equities on the NYSE, AMEX, and the NASDAQ totaled USD 267 billion, a figure, which had multiplied nearly four-fold by 1996.

Another investment vehicle: American Shares

American shares are shares of a foreign corporation issued directly to U.S. investors through a transfer agent. The foreign corporation has to meet all S.E.C. regulations that apply to all listed U.S. corporations. American shares are denominated in the currency of the foreign company; dividends and capital gains are received in foreign currency. Many investors find American shares to be inconvenient because they trade and pay dividends in the foreign currency. American shares have low liquidity in the U.S. and, generally, are held by large investors. \blacklozenge

3.A.1.i <u>The mechanics of ADRs</u>

Under an ADR program, foreign shares are deposited with a U.S. bank or U.S. trust company that, in turn, issues ADRs in the name of the foreign company. That is, for U.S. investors, ADRs are receipts for stocks of specific foreign companies issued by U.S. banks and trust companies. A U.S. or foreign bank holds the actual stock in a custodial account, receives dividends and converts them to dollars, pays any foreign taxes, and passes the net amount on to the investors. These ADRs may trade freely, just like any other security, either on an exchange or in the over-the-counter market, and can be used to raise capital.

To avoid unusual share prices, ADRs may represent a combination or a fraction of several foreign shares. For example, Japanese shares are often priced at only a few yen per share. They are therefore combined into lots of 100 or more so that their value is more like that of a typical U.S. share price. On the other hand, an ADR on a German stock may represent one-fourth of a share.

On the depository side, three institutions --Bank of New York, Citibank and JP Morgan-- hold more than 95% of the action. In the first six months of 1995 Bank of New York held an 81% share of new ADR public U.S. offerings, against Citibank's 13% share. Citibank, on the other hand, has the more actively (and liquid) traded ADRs.

3.A.1.ii <u>Types of ADRs</u>

There are two kinds of ADR facilities: sponsored and unsponsored. A *sponsored* ADR facility is created pursuant to a deposit agreement between the issuer of the foreign security, the depositary, and the holder of the ADRs. *Unsponsored* ADR facilites are created by a depositary alone and the only document consists of the ADRs issued by the depositary. Once a depositary has created an unsponsored ADRs, it is common practice for other depositaries to copy it, creating duplicate unsponsored ADR facilities. Sponsored facilities are exclusive to one depositary and cannot exist simultaneously with unsponsored ADRs because sponsored and unsponsored ADRs trade at different prices. The price is different because in sponsored ADR facilities the issuer reimbursed the depositary for its expenses in disbursing dividends to ADR holders, while in unsponsored ADR facilities ADR holders themselves bear such expenses.

Exchange listed ADRs are traded and quoted on stock exchanges (NYSE, the American Stock Exchange (AMEX), and NASDAQ). In 1995 there were 316 listed ADRs, with a share trading volume of almost 11 billion shares.

Unlisted ADRs include such variations as OTC Level I, Regulation S and Rule 144-A offerings.

OTC Level-I is the simplest way for a foreign company to access U.S. and non-U.S. capital markets by allowing trading over-the-counter and on some non-U.S. exchanges. Level Is, commonly known as pink sheets, are the fastest-growing segment of the DR business. A Level I ADR does not have to comply with U.S. GAAP, it is not compelled to make a full disclosure to the S.E.C. Many companies involved in OTC Level I programs, however, ultimately upgrade to Level II or Level III programs, which mandate greater regulatory compliance in exchange for more visibility and attractiveness to investors. OTC Level II ADRs are used by foreign companies that wish to be listed on a U.S. exchange. OTC Level III ADRs are used by companies that wish to raise capital in the U.S. through an equity offering.

Regulation S ADRs are programs that trade outside the U.S. among non-U.S. investors.

Rule 144-A (RADR) are ADRs that are privately placed in the U.S. They are allowed under Rule 144-A adopted by the S.E.C. in 1990. Rule 144-A greatly increased the liquidity of privately placed securities by allowing qualified institutional buyers (QIBs) to resell these securities to other QIBs without the earlier requirement of a three-year holding period. QIBs included institutions that manage at least USD 100 million in securities and registered broker-dealers that own and invest on a discretionary basis at least USD 10 million in securities of non-affiliates. The first Russian ADR was a Rule 144-A program by Mosenergo, brought to market by Salomon Brothers in October 1995.

Note that ADR programs can be terminated. When a company decides to terminate the Depositary Agreement, ADR holders are given the choice of surrendering the ADRs –i.e., liquidating the shares and receiving market values minus some fees- or request delivery of the underlying shares –i.e., retaining the shares, traded in the company's home market. On January 28, 2015, The Bank of Ireland (ticker symbol, NYSE:IRE) decided to terminate the ADR program, with an effective termination date of April 22, 2015. Shareholders were given until April 22, 2016 to make a decision regarding their shares, to surrender or to keep them.

In Table XI.4 we present a selected group of ADRs.

TABLE XI.4

Market Capitalization of Selected Major Foreign Stocks traded as ADRs

AUSTRALIA		
BHP Billiton (NYSE:BHP)	USD 22.151B	
News Corporation (NYSE:NWS)	USD 31.510B	
BRAZIL		
Companhia Vale do Rio Doce (NYSE:VALE)	USD 3.19B	
FRANCE		
Total Fina Elf S.A. (NYSE:TOT)	USD 98.37B	
L'Oreal S.A. (OTC:LORLY)	EUR 43.23B	
PSA Peugeot Citroen S.A. (OTC:PEUGY)	EUR 10.26B	
GERMANY		
BASF Aktien (NYSE:BF)	USD 23.71B	
Bayer Aktien (NYSE:BAY)	USD 22.90B	
Deutsche Bank AG (NYSE:DB)	USD 36.02B	
Siemens Aktien (NYSE:SI)	USD 50.27B	
JAPAN		
Canon Inc (NYSE:CAJ)	USD 26.98B	
Fuji Photo (NasdaqSC:FUJIY)	USD 15.57B	
Honda Motor (NYSE:HMC)	USD 18.66B	
Toyota Motor (NYSE:TM)	USD 90.65B	
MEXICO		
Turbo Aceros de Mexico S.A. (AMEX:TAM)	USD 653.5M	
Telefonos de Mexico (NYSE:TMX) USD 25.96B		
NETHERLANDS		
Heineken N.V. (OTC:HINKY)	EUR 14.11B	

Royal Dutch Petroleum (NYSE:RD)	USD 106.0B
SWEDEN	
LM Ericsson Telephone Co. (NasdaqNM:ERICY)	USD 33.63B

Note: Market Capitalization as January 2002.

• NYSE and the ADR Market

In 1997, the NYSE listed nearly 3,000 companies. Of those companies, 326 are foreign companies. Non-U.S. trading volume amounted to nearly a tenth of total volume traded on the NYSE in 1996. This number is consistent with the so-called "home bias" in domestic portfolios, which will be discussed in Chapter XI. U.S. institutional investors are now moving their holdings of non-U.S. equities up to about 15-20 percent of their portfolio. This number still leaves a lot of room for further expansion: the U.S. economy accounts for only a fifth of world gross product and for well under half of the total value of the world's equity markets. The NYSE plans to grow by taking advantage of this probable expansion of U.S. investment in foreign equities.

According to the NYSE, there are only 700-750 U.S. companies, which meet the NYSE's listing requirements and are not already trading on the exchange. If NYSE got them all to sign up, the market's total value would rise by less than 10 percent. By contrast, around 2,300 foreign companies meet the NYSE's listing requirements. If the NYSE could persuade the largest third of these to sign up, its market valuation would increase by more than two-thirds. In order to make the NYSE more global in character, the exchange has committed itself to trading in decimals rather than fractions over the next few years.

NYSE officials talk about a world, a few years in the future, in which their market will be trading on a global clock, in global currencies and in international securities other than today's ADRS. •

3.B Exchange Traded Funds (ETFs)

One of the most successful financial instruments introduced in the past 25 years is the *exchangetraded fund (ETF)*, also known as *exchange traded products*, or (*ETP*). ETFs are like open-ended mutual funds except that they can be bought and sold on an exchange like ordinary stocks. Investors can purchase or sell them through their brokers during trading hours. An ETF holds assets such as stocks, commodities, or bonds. Most ETFs track an index, such as the S&P 500, the MSCI EAFE or the MSCI Switzerland.

Relative to mutual funds, ETFs are an attractive investment tool because of their low costs and stock-like features. The growth of ETFs has been phenomenal, as illustrated in Graph XI.2. Since the launch of the first ETF in 1993, the ETF industry has grown to over USD 2.4 trillion in assets with over 5,700 ETFs available around the world in just 20 years –USD 1.7 trillion across over 1,500 products, as of December 2013.

GRAPH XI.2 The Growth of ETFs

Assets (\$bn) # of ETPs 5,024 5,102 \$2,400 4.759 5.000 \$2,200 4,311 \$2,000 3.543 4.000 \$1,800 \$1,600 2.694 \$1,400 3.000 2.44 2,220 2,396 \$1,200 1,541 \$1,000 .944 2,000 883 \$800 1.52 483 524 \$600 .156 357 1,000 300 \$400 85 290 \$200 598 421 0 \$0 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 Mar-14 2000 2001 Source: BlackRock, "ETP Landscape: Industry Highlights."

Global ETP Assets & Number of ETPs by Year¹

ETF Research Report March 2014

3.B.1 ETFs: Mechanics

ETFs are similar to traditional mutual funds. They offer investors an undivided interest in a pool of securities and other assets. But, unlike traditional mutual funds, shares in an ETF can be bought and sold throughout the day like stocks on a securities exchange through a broker-dealer. Unlike traditional mutual funds, ETFs do not sell or redeem their individual shares at net asset value (NAV). Instead, financial institutions purchase and redeem ETF shares directly from the ETF, but only in large blocks, varying in size by ETF from 25,000 to 200,000 shares, called "*creation units*". Purchases and redemptions of the creation units generally are in kind, with the institutional investor contributing or receiving a basket of securities of the same type and proportion held by the ETF, although some ETFs may require or permit a purchasing or redeeming shareholder to substitute cash for some or all of the securities in the basket of assets.

The ability to purchase and redeem creation units gives ETFs an arbitrage mechanism intended to minimize the potential deviation between the market price and the NAV of ETF shares. Existing ETFs have transparent portfolios, so institutional investors will know exactly what portfolio assets they must assemble if they wish to purchase a creation unit, and the exchange disseminates the updated net asset value of the shares throughout the trading day, typically at 15-second intervals.

Closed-end funds are not considered to be "ETFs", even though they are funds and are traded on an exchange. ETFs have been available in the US since 1993 and in Europe since 1999. ETFs traditionally have been index funds, but in 2008 the U.S. SEC began to authorize the creation of actively managed ETFs.

3.B.2 ETFs: International Investments

Investors can use ETFs to invest in international markets. Many ETFs have as their underlying tracking instrument an regional index or other financial product focused on a single country index. They are usually well diversified and designed to reflect the overall economic condition of the country itself. The underlying index chosen is often the major index of the principal exchange within the country. In the U.S., the NYSE has over 40 ETFs tracking an international index, while NASDAQ has 35. In the Hong Kong SE, there are over 20 ETFs tracking international indexes.

Domestic investors choose international-based ETFs for several reasons. They wish to diversify their portfolio, by holding a broadly based portfolio of shares from a country without having to directly purchase shares within the country. They may also look for the extra yield in international markets. International-based ETFs allow them to do this with a smaller investment and less complication than directly purchasing shares.

3.C Financial Analysis

Financial analysis in an international context is not an exotic field to domestic analysts. Analysts should consider foreign variables into account to price domestic firms. The product markets in which many domestic industrial companies compete are international. The methods and data used to analyze U.S., Mexican, or Malaysian companies are quite similar. The analysis of a company should produce two pieces of information: a measure of expected return and a measure of risk.

The expected return on an investment can be measured by a quantitative measure, such as a rate of return, or by a qualitative measure such as buy or sell recommendations. On the other hand, risk can be measured by a single number or by a sensitivity analysis that measures how much a company's value responds to changes in key factors such as economic activity, currency volatility, general market conditions and political stability.

3.C.1 <u>The information problem</u>

Financial analysts usually follow a two-step process to value a company. In the first step, based on the financial statements of a company, analysts assess the overall strength of the company, along with the company's growth possibilities. On the basis of this analysis, analysts make forecasts of the company's future earnings. At the end of this first step, analysts should produce a forecasts for the company's earning per share (EPS). In the second step, analysts try to predict how the stock market will value these forecasts. That is, analysts emphasize the relative valuation of the company within the stock market.) The traditional measures for this second step are the price-earnings (P/E) ratio and the market-to-book (M/B) ratio. (The M/B ratio is also called price-to-book (P/B) ratio.) The P/E ratio represents what the market is willing to pay for a unit of earnings, while the M/B represents the market's evaluation of the employed capital per share versus what the capital cost.

To do the above mentioned two-step process, analysts require a good amount of information. In the U.S., information on companies is very easy to obtain. If you have access to the Internet, Edgar Online will give you the quarterly and annual reports of any listed company. In international

markets, however, we will be faced with two major information problems. The most important problem in some markets is the lack of information or, at least, good information. The second problem is related to the interpretation of the data.

3.C.1.i Quality of information

In the U.S., companies publish their quarterly earnings, which are publicly available within just a couple of weeks. Before the official release, U.S. companies issue "early earning warnings" if the quarterly results are significantly different from what analysts have been expecting. British and Japanese firms publish U.S.-style financial statements. In contrast, some European and Far Eastern firms only publish their earnings once a year. The vast majority of multinational and large domestic firms tend to publish both in their local language and in English. Many reports, especially for small firms, are only available in a company's local language.

Insider trading affects the quality of information publicly released to the market. Insider trading -trading on non-public information that could affect a stock price-- makes a stock market unattractive, especially to international investors. International investors want to know that they are trading on a level playing field, that they have access to the same company information that local investors do. In the well-established markets, strict rules severely punish insider trading and, therefore, the information released by a company has a potential impact in the value of its stock. In many emerging markets, insider trading is a real problem. International investors have pushed for change in insider trading rules from South America to Southeast Asia. There is, however, still room for improvement (see the box "Dealing with Insider Trading: South Africa" below).

Many international brokerage houses and banks compile reports and guides summarizing accounting information for foreign firms. The reports often include non-accounting information such as earning growth forecasts, expected returns on equity investment, and risk measures such as betas, which are discussed below.

• Dealing with Insider Trading: South Africa

After ten years of political transformation, the Johannesburg Stock Exchange (JSE) has decided that it, too, must change. The JSE was notoriously famous among international investors by its insider trading. With a newly enacted law, the Insider Trading Act, South African regulators are after insider traders. In the first year under the new law, the regulators have won six settlements with insider traders. Under the old law, not once did South Africa ever win an insider trading conviction. South Africa, however, has nothing like the American S.E.C.'s army of investigators and prosecutors with the skills and resources to turn complicated investigations into viable prosecutions. But, giving potential insider traders cause for concern is seen as a step forward in South Africa. **Source:** *The New York Times*, May 11, 2000. ◆

3.C.1.ii <u>Comparative analysis</u>

Accounting methods are different across countries. Most non-U.S. methods provide less information to investors of what lies behind the figures a firm reports on profit statements and balance sheets. It is usually uninformative to compare financial statements from different countries without making adjustments for the different standards.

Example XI.9: Many companies in Japan and South Korea do not report profits and losses on a consolidated basis, instead they hide losses among subsidiaries while reporting profits for the entire company.¶

Example XI.10: Mexican companies still use inflation accounting. They increase the value of the assets of the company to keep up with inflation, but then they record a gain from that increase value. While in the U.S., many firms take advantage of increasing prices (inflationary conditions) by using LIFO (Last-In-First-Out) for inventory valuation, which can distort (lower) net income. \P

Example XI.11: Because the treatment of depreciation and extraordinary items varies so much among countries, an analyst would probably double the net income of Swedish or Japanese firms, in order to make a meaningful comparison to the corresponding figures for U.S. or British firms. ¶

But even where the same accounting methods are used, cultural, institutional, and tax differences can make cross-country comparisons of accounting numbers misleading.

Example XI.12: Comparing Japanese and U.S. earnings figures or accounting ratios is meaningless. The U.S. accounting standards are more conservative than the Japanese standards. Most large Japanese companies, however, publish secondary financial statements in English that conform to the U.S. GAAP and audited by major U.S. accounting firms. Institutional factors, however, make these U.S.-style statements difficult to interpret. For example, financial leverage is high in Japan compared to the U.S., which does not mean that Japanese firms are riskier. (Recall that, in Japan, banks and clients have a closer relation than their U.S. counterparts). ¶

The following list presents the major differences in international accounting practices:

- Publication of consolidated statements
- Inflation accounting
- Depreciation rules
- Inventory valuation
- Publication of accounts corrected for fiscal distortion
- Currency adjustment
- Treatment of extraordinary expenses
- Existence of "hidden" reserves

Misunderstanding asset values and reported profits played a major role in the 1997 Asian crisis. The lack of uniform accounting standards is costly. International banks and investors charge higher interest rates to companies that do not adjust their books to U.S. standards. Moreover, many foreign firms do not have access to international capital markets because their national accounting standards distort valuations. Japan, for example, ranks below Spain and South Korea on access to international capital markets. This very surprising fact is partially explained by the Japanese accounting methods.

Cross-country research by Fan and Wong (2002) and Leuz et al. (2003) suggests that managers smooth earnings to create opacity to allow expropriation of assets. To the extent that the accounting system creates opacity and information asymmetry, it is likely to reduce the willingness of investors to trade and, thus, to increase the liquidity premium. In their sample of 21 EAFE markets, Lang et al. (2009) estimate that moving from the 25th to 75th transparency percentile is associated with a 40% decrease in the median bid-ask and a 17% reduction in the number of non-trading days.

Applied Corner: Pension Accounts

Japanese companies have assumed unrealistic capital gains for years for their pension accounts. Now, corporate pension plans are greatly underfunded. In 1999, some experts estimate the pension shortfall at USD 500 billion. This is a debt that companies will have to pay in the future.

Many European companies did not keep pension funds separate. They used the pension funds to finance operations year in-year out. Now, many European firms are facing great liabilities. To correct this problem, European companies are separating their pension accounts from the companies' accounts, following the U.S. model. The U.S. model is governed by the Employee Retirement Income Security Act or ERISA. In 1974, the U.S. Congress was worried that without separate pension accounts, companies could go bankrupt and leave employees without a security net. Source: *Los Angeles Times*, May 1999.

3.C.1.iii <u>Convergence</u>

Bankers, investors, insurance companies, and pension funds are pushing for uniform international accounting standards. In the past fifteen years, there has been an ongoing conversation about converging accounting standards between the International Accounting Standards Board (IASB), based in London, and the Financial Accounting Standards Board (FASB), based in the U.S. The IASB sets and promotes the International Financial Reporting Standards (IFRS). The FASB caters to the development of U.S. GAAP.

In 2005, IFRS overtook GAAP as the most widely used set of accounting standards in the world. Graph XI.3, taken from Willmore (2015), shows the movement towards IFRS worldwide. With the exception of U.S. and Colombia, most of the countries with no or unknown convergence plans are underdeveloped countries in Africa, countries experiencing political unrest in the Middle East, and communist Cuba. According to Seay (2014), those in favor of IFRS say it is the "gold standard."

In general, there is agreement in the accounting profession that IFRS is a more principles-based approach as opposed to GAAP, which is more rules-based. The principles based IFRS allows more flexibility for its users than GAAP, since it allows business professionals to use their experience and judgment to make decisions regarding financial reporting -see, Briginshaw (2008). It is said, however, that many U.S. accountants prefer the rules based GAAP approach to help reduce their liability as much as possible due to the high volume of lawsuits in the U.S.

. **GRAPH XI.3** Worldwide Convergence Towards IFRS



It is easy to see the advantage of converging standards. They provide a universal set of standards that make easy the comparison of financial reporting among businesses and across borders. It is also easy to see the disadvantage: costs! Changing accounting standards would involve a major change for U.S. companies, which would be costly. Lin (2013) estimates that the cost of a full switch to be between 0.5% to 1% of annual revenues. This could be between USD 40-60 billion for companies in the S&P 500.

The U.S. Securities and Exchange Commission (SEC) already oversees more than 1,300 foreign firms that trade their securities in the U.S. These foreign firms had to adjust their accounting and disclosure methods to the U.S. standards. The reverse is also true; U.S. companies listed abroad have to adjust their accounting methods to the local standards. Converging standards would make the job easier for international companies. In 2007, recognizing this situation and as part of the push in favor of IFRS principles, the SEC allowed foreign private issuers in the United States to report their financials under IFRS without reconciling them to U.S. GAAP.

By the end of 2008, the U.S. SEC published a roadmap with a convergence date: December 15, 2014. Under this roadmap, publicly traded companies faced a staged transition towards IFRS standards. The stages depended on the market capitalization of each company. However, the

roadmap faced many problems and pressures. As of 2015, convergence is unlikely to happen any time soon. The issues of controversy have been fair value/mark-to- market accounting, revenue recognition, financial statement presentation, rules for capitalization of leases, and inventory valuation.

Progress towards convergence has been done in many of those areas. However, the issue where convergence is seen as most difficult is inventory valuation. IFRS does not allow the last-in-first-out (LIFO) method of valuing inventory. According to Reed and Pence (2013), the LIFO method is used by approximately 36% of companies to value at least some part of their inventory. LIFO tends to inflate costs and lower taxes.

3.D Valuation

Given the different accounting standards and financial practices around the world, we observe that national stock markets seem to use different valuation criteria. For example, similar earnings announcement can lead to different price reaction in different countries

Example XI.13: In Table XI.5 we observe that the average price-earnings ratio varies greatly among countries in May 1994 (indexes are in U.S. dollars).

Index	M/B	P/CE	P/E	Yield
Australia	1.72	10.6	17.2	3.4
Hong Kong	2.16	14.2	16.6	2.9
Japan	2.33	11.9	88.0	0.7
New Zealand	1.89	10.1	13.7	4.3
Singapore	1.96	12.6	20.4	1.3
U.K.	2.22	9.7	15.5	4.2
France	1.55	7.7	27.2	3.1
Germany	2.10	6.2	60.3	2.4
Netherlands	1.71	7.8	17.6	3.5
Sweden	2.31	12.0	20.4	1.3
U.S	2.58	9.9	19.5	2.8
Canada	1.77	11.4	44.7	2.5
World	2.26	9.9	26.7	2.2
EAFE	2.13	9.9	33.8	1.9

 TABLE XI.5

 AVERAGE FINANCIAL INDICATORS FOR DEVELOPED MARKETS

Notes: M/B: market-to-book value; P/CE: price-to-cash-earning ratio.

The ratios presented in Table XI.5 are routinely used to compare valuations across firms or industries. This way of comparing firms or markets is called valuation by *multiples*. Valuation by multiples is a process in which a ratio for a given firm is compared to the ratio of similar firms. Let us concentrate on the most popular multiple, the P/E ratio. Recall that a P/E ratio tells investors how long they have to wait to recover their investment in terms of earnings –assuming that current earnings are an excellent predictor of future earnings. For example, suppose Dell Computers (NYSE:DELL) and Hewlett-Packard (NYSE:HWQ) are considered similar companies. If the P/E ratio of Dell Computers is higher than the P/E ratio of Hewlett-Packard, analysts will conclude that the market values more aggressively Dell's earnings than Hewlett-Packard's earnings.

Comparisons across international markets are trickier than comparisons across domestic markets. U.K. firms have lower P/E ratios than firms from Germany or Japan; however, this does not indicate that U.K. firms are cheaper companies. Table XI.5 indicates that there are national differences in earnings accounting, rather than miss-pricing of comparable firms. For example, Japanese or U.S. companies tend to sell well above their accounting book values if their M/B ratios are compared to those of New Zealand or Canadian firms. But this does not mean that U.S. firms should be sold and Canadian firms should be bought.

3.D.1 <u>Discounted Dividend Model</u>

The classic way of calculating the *fair price* of a company is to use some form of the discounted cash flow (DCF) model. A popular variation of the DCF model is the discounted dividend model (DDM). Under a DDM, the value of an asset is determined by the cash flows it generates for the investor. In a DDM the stock market price is set equal to the discounted stream of forecasted dividends.

 $P_t = E_t[D_{t+1}]/(1+r_1) + E_t[D_{t+2}]/(1+r_2)^2 + E_t[D_{t+3}]/(1+r_3)^3 + E_t[D_{t+4}]/(1+r_4)^4 + \dots,$

where $E_t[D_{t+j}]$ represents the time t+j expected dividends, conditional on today's information (time t), Pt is current stock market price, and rj is the discount rate, or required rate of return, for j periods ahead.

Note that to estimate a fair price for a company, we need to forecast future dividends ($E_t[D_{t+1}]$, $E_t[D_{t+2}]$, etc.), and we need a to calculate an appropriate discount rate (r_j). In addition, if the company is a foreign company, foreign exchange rates need to be forecasted to translate expected dividends to the domestic currency. As discussed in Chapter VIII, we can eliminate currency risk by using the appropriate forward rates to convert futures expected dividends to the domestic currency.

A usual approach to estimate future dividends is to estimate the future path of the firm in three phases:

(a) Near term (i.e., the next two years): earnings are forecasted individually.

(b) Medium term (i.e., the next two to five years): a general growth rate for the company's earnings is estimated. (For example, the growth rate in earnings reverts to the average in the industry.)

(c) Long term: the growth rate in earnings is supposed to revert to the average of all firms in the market.

The second element needed to estimate the DDM for a company is an appropriate discount rate, r_j. If the risk of the expected cash flows is stable over time, firms can discount cash flows using risk-adjusted cost of capital, which is represented by a risk-free rate plus a equity risk premium (ERP). The Capital Asset Pricing Model (CAPM), discussed in the Review Chapter, or the 3-factor Fama-French model provides a simple framework to estimate a risk premium.

• Discount Rates and Risk Premium

The discount rate is influenced mainly by two factors: bond yields and the equity risk premium (ERP). For well-established markets, and keeping variables in real terms, government bond yields are about 3%. Government bond yields are taken to represent risk-free rates. The size of the risk premium, however, is more difficult to establish. As mentioned in Chapter X, there is no clear consensus about how to estimate the ERP and what it should be, even for established markets, with long data sets. For example, as reported by Duarte and Rosa (2015) for the U.S., ERP estimates range from almost zero to 13%. Not very precise! \bullet

Note that the DDM equation can be used to estimate a constant discount rate, or required rate of return (r). If the expected dividends (D_t) and the current stock market price (P) are known, then a firm will be able to estimate r. If, in addition, government bond yields are known (say, 3%), then the ERP can be extracted!

Example XI.14: Using DDM to calculate the fair value of VALE ADRs

It is December 29, 2017. Suppose we want to use the DDM to value the ADR of Vale S.A. (NYSE:VALE), Brazil's mining giant. The company was privatized in 1997, but the Brazilian government still has a strong influence. Mineral prices have been relatively low during the past 5 years; iron one, Vale's main revenue driver, has lost half its value, moving from USD 150 per ton in 2012 to USD 750 per ton in late 2017.We need input values for $E_{d}[D_{t+j}]$, r_{t+j} , and S_{t+j} , for j>1 Today's price of a VALE ADR is USD 12.60. Brazil has a heavily managed exchange rate, with today's $S_t = 3.23$ BRL/USD. In the past 18 months, the BRL/USD has been in the 3.00 to 3.60 BRL/USD range.

(1) Estimation of $E_t[D_{t+j}]$.

One of the problems in emerging markets is developing a model for forecasting D_{t+j} ; especially in companies where the government still has a big say in the distribution of cash flows. In 2017, VALE paid a BRL 0.905 dividend per share. VALE's dividends have been very volatile in the past 10 years, paying from BRL 0.166 per share in 2016 to BRL 2.260 per share in 2012; for an average dividend per share of BRL 1.22. The current level of dividends is considered low and we attribute it to temporary low mineral prices and government pressures. Dividends are expected to increase by an average 8% for the next two years. The predicted growth rate of dividends (in BRL) after the next two year until the year 2024 is 16%. This level of dividend growth is very low for international standards. It is unrealistic to expect this dividend growth forever. After the year 2024, we expect the company's dividend growth rate to revert to the level of international mineral companies, which is estimated to be 125%.

(2) Estimation of r_{t+j} .

The required rate of return is very complicated because we should make assumptions about how security prices are determined. Suppose we use the integrated CAPM. According to CAPM, we should estimate:

 $E[r_{\text{VALE}}] = r_f + E[r_m\text{-}r_f] \ \beta_{\text{VALE}}.$

We obtain the following inputs: $\beta_{VALE} = 2.40$; $r_f = .035$; $E[r_m] = .08$. Therefore,

 $E[r_{YPF}] = .035 + (.08 - 035) \times 2.40 = .143.$

(3) Estimation of S_{t+j}.

Given Brazil's history of price instability, there is an expectation that a volatile exchange rate will continue. For this reason, analysts believe the USD will appreciate following PPP for an average rate of 4% a year against the BRL for the foreseeable future.

Now, we are ready to value a VALE ADR (P).

First, we determine the USD discounted value of all the cash flows from 2018 until the year 2019 (year 2). We call this value P_{1-2} .

 $P_{1\cdot 2} = [BRL .903/(3.23 BRL/USD^*(1.04))]^* 1.08/(1.143) + [BRL .903/(3.23 BRL/USD^* (1.04)^2)]^* (1.08)^2/(1.143)^2 = USD 0.445$

Second, we determine the discounted value of all the cash flows from 2020 to 2024, P₃₋₇.

After 2 years, the expected dividend is BRL 1.0533. Then, P₃₋₇ is determined by:

$$\begin{split} P_{3\text{-7}} &= BRL \ 1.0533*1.16/(3.23 \ BRL/USD*(1.04)^3)/(1.143)^3 + \ldots + \\ &+ BRL \ 1.0533*1.16^5 \ /(3.23 \ BRL/USD*(1.04)^7)/(1.143)^7 \ = \textbf{USD} \ \textbf{0.659} \end{split}$$

The discounted dividends per share in year 8 will be:

BRL $1.0533^{(1.16)}/[3.23 \text{ BRL/USD}^{(1.04)}] = \text{USD .5205.}$

The effective USD rate of dividend growth is [(1.125)x(.96) - 1] = .08.

The USD present value of all futures cash flows after year 7 is given by

 $P_{8+} = USD .5205 x (1.08)/[(.143 - .08)] = USD 8.923$

The present value of a YPF ADR is $P = P_{1-2} + P_{3-7} + P_{8+}$

P = USD 0.445 + USD 0.659 + USD 8.923 = USD 10.027.

Comparing this price to the December 2017 price of **USD 12.60** indicates that the Vale ADR was overvalued by the market, given our estimates of the variables in the DDM. \P

The problem with the DDM is that companies have discretion over their dividend payments. Even after financing capital expenditures, they do not need to pay the rest of their cash flows in dividends. They can also use the money to repurchase shares, retire debt and make acquisitions. As a result, payout ratios vary considerably. The U.S., for example, has a much lower payout ratio than the U.K. This makes discounting dividends a complicated exercise.

Weighted Average Cost of Capital

An alternative approach is to discount free cash flows using the weighted average cost of capital (as discussed in Chapter X), where free cash flows are defined as:

Free cash flows = EBITDA – Taxes - ΔWC – CEx,

where EBITDA represents earnings before interest, taxes, depreciation and amortization, Taxes represents taxes after interest deductions, ΔWC represents change in net working capital, and CEx represents capital expenditures already planned. These free cash flows represent the cash flows available to the shareholders and creditors after all expenses, payments to government, and necessary maintenance investments have been made. Once the free cash flows are calculated for different years, the free cash flows are discounted using the weighted-average cost of capital, k_c:

 $k_c = k_{WACC} = k_e (E/V) + (1-t) k_d (D/V),$

where k_{WACC} is the WACC, k_e is the cost of equity (usually, it's risk-adjusted), k_d is the before-tax cost of debt, t is the marginal tax rate, E is the market value of the company's equity, D is the market value of the company's debt, and V is the market value of the firm (E+D).

3.D.2 Valuation by Multiples

Another popular use of the DCF model produces equilibrium price-earning (P/E) ratios. The P/E ratio is the most popular valuation ratio and it is widely in the valuation by multiples process. To derive equilibrium P/E ratios, we use a slightly different measure for free cash flows. We define free cash flows as earnings after interest, tax, and capital expenditures, but before depreciation and amortization –this information is calculated from ordinary after-tax earnings. To this measure of cash flows, we make two downward adjustments. The first cut is because the cost of replacing wornout assets is higher than their original cost. The second is because companies invest also to expand. These two factors -about 10% in the first case and 25% in the second- reduce free cash flows to roughly two-thirds of earnings. Given these assumptions and assuming that in a steady state corporate earnings grow in line with trend economic growth, it is possible to calculate steady state (or equilibrium) fair price earning multiples for shares in different markets.

Example XI.15: Calculating the steady state P/E for the U.S.

It is February 2012. Assume that real economic trend growth (g) is 2.5% a year. That is, corporate earnings (E), in the steady state, are growing at 2.5% a year. Assume that the real bond yield is 1.8% -long term bond U.S. yield is 5% and long term U.S. inflation is 3.2%. The 2011 IESE Business Scholl Risk U.S. Market Risk Premium reports a weighted average of 5.5%. Then the discount rate, r, is equal to (1.8%+5.5%) 7.36%. Now, we are ready to discount free cash flows (CF), which we assume equal to two-thirds of earnings:

$$\begin{split} P &= CF_1/(1+r) + CF_2/(1+r)^2 + CF_3/(1+r)^3 + CF_4 \ /(1+r)^4 + CF_5 \ /(1+r)^5 + \\ P &= 2/3 \ E(1+g)/(1+r) + 2/3 \ E(1+g)^2/(1+r)^2 + 2/3 \ E(1+g)^3/(1+r)^3 + 2/3 \ E(1+g)^4/(1+r)^4 + ... \end{split}$$

This formula simplifies to:

P = 2/3 E [(1+g)/(1+r)] / [1 - (1+g)/(1+r)].

Then,

P/E = 2/3 [1.025/1.073]/[1 - 1.025/1.073] = 14.24,

Today, at the end of February, the S&P 500 was at 1,352.49, while the S&P 500's earnings were 90.08, therefore, the market P/E Value was **15.01** (=1352.49/90.08).

Thus, according to our valuation, the U.S. equity market was a bit overpriced at the end of February.

The global economy is not in a steady state. Growth rates change over time. Over the business cycle, profits take different proportions of the GNP. For example, when countries are in the advanced stages of the business cycle, wages rise at a faster pace. Therefore, P/E ratios have to be adjusted according to the current economic conditions of each country.

Example XI.16: Suppose the European economy is in the early stages of a downturn. On the other hand, suppose that China is advanced in the business cycle, but there is still plenty of room for improving the efficiency of firms through restructuring. Therefore, the steady state multiplier for Europe needs to be adjusted downward -say, by around 10%-, while the steady state P/E of China needs to be adjusted upward - say, by 20%. ¶

• P/E Ratios Do Change

The P/E ratio for the U.S. S&P 500 index has varied mostly between 5.3 and 124 from 1872 to 2011, averaging only 15 for the entire period. The P/E ratio moved above 27 for the first time in mid-1998 and reached a record high 124 in 2009, mainly due to a tremendous drop in earnings.

Do High P/E ratios have implications for stock prices and earnings? Campbell and Shiller (1998) found that higher P/E ratios are usually followed by lower stock price growth during the following decade. Reinforcing these results, Campbell and Shiller also found that higher P/E ratios are usually *not* followed by faster earnings growth. ◆

Recall that investors do not care about returns denominated in foreign currencies. All cash flows (dividends and capital gains) should be multiplied by the exchange rate. Therefore, to make an international comparison of expected returns, analysts need to forecast currency movements, which, as we have studied already, are very difficult to forecast.

The presence of so many different factors explains why most international money managers value corporations relative to their domestic markets, before even trying to value them globally in relation to their direct product market competitors.

IV. International Investing

International investing is not a new trend of the 1990s. In fact, the London Stock Exchange traces its origin to international investing. In 1553, the first joint-stock company, where the public subscribed to ownership in equal shares, was founded in London following advice from the famous explorer

Sebastian Cabot. Merchants at that time wanted to trade with the then mysterious Far East and were attracted by Cabot's suggestion of searching for a North-East passage. On May 10, 1553 three ships departed from Deptford, near London and headed north. The expedition never reached the Far East, but one of the ships ended up in Russia. The captain of the ship was able to secure a treaty with the Czar Ivan the Terrible, who granted freedom of trade to English ships. The Muscovy Company was founded out of this event. The Muscovy Company was the first company where ownership and day-to-day management were separated with shares freely traded.

In the economic development of the Victorian Age international investment played what was recognized to be an essential part. International trade grew rapidly. Great Britain took the leading part in this process, and the amazing expansion of British economic power in the nineteenth century is to be attributed in on small part to international investment. The process of international investment did not work with uninterrupted smoothness. It was punctuated by occasional financial crises (notably, for example, the Baring crisis in the 1890s), by the 1930s depression, by currency difficulties, by wars, and by periods of default on the part of the borrowing nations. More recently, international investing took on a faster pace. International investment has increased four times, during the past 15 years.

International investing has probably been around for centuries, and probably for thousands of years. This fact might be a bit surprising. International investing does not seem easy. International investors need to analyze assets from a huge number of asset classes (stocks, bonds, derivatives, etc.), and from different national markets and currencies. The number of individual securities to invest presents a big challenge for international investors. The challenge is not a valuation problem since the same techniques and models used to value a domestic asset are usually used to value a foreign asset. The challenge is a practical once: international investors have to reduce each investment to a tractable number of parameters, otherwise the resources spent on international investing would be too high. Therefore, international investors need to (1) identify the major factors influencing international security price behavior, and (2) determine the sensitivity of each security to these factors.

4.A <u>Risk-Return in International Markets</u>

Table XI.6 reports the USD mean annual returns on MSCI equity indexes from 11 developed markets, along with the World and EAFE Indexes. The data cover the 1970-2017 period and are reported monthly.

Over the past 47 years, Hong Kong and Singapore show the best returns in Developed Markets, but we need to take into consideration the risk taken by an investor. Using the Sharpe ratio (with a 4.74% risk-free rate) to measure the risk-return trade-off, Switzerland and Hong Kong have the best performances over the past 47 years.

We can use the above numbers to compute the equity risk premium. If we consider that the average U.S. T-bill rate during the 1970-2017 period was 4.74%, the realized equity risk premium for the U.S. is 3.45% (= 8.19 - 4.74). There is no agreement on what the equity risk premium should be; in

general, the reported numbers for the U.S. market are between 3% and 8%, which place our 3.45% estimate on the lower side of the range.

Market	Return	Standard	Sharpe
		Deviation	Ratio
U.S.	8.19	15.04	0.2295
Canada	8.22	19.35	0.1801
France	9.02	22.17	0.1927
Germany	9.37	21.67	0.2135
Italy	5.08	25.38	0.0315
Switzerland	10.44	17.83	0.3193
U.K.	7.77	21.44	0.1411
Japan	9.94	20.74	0.2506
Hong Kong	16.80	33.72	0.3578
Singapore	12.26	27.79	0.2705
Australia	7.68	23.79	0.1233
World	7.70	14.58	0.2026
EAFE	8.00	16.78	0.1945

Table XI.6MSCI Index USD Annual Returns: (1970-2017)

Since stock returns are calculated with error (even for large portfolios, like the above indexes), using a long data set is important: the longer the data set, the smaller the sampling error and, thus, the more precise the estimation. Dimson, Marsh and Staunton (2011) used data from 1900-2010 to report for mainly 19 developed markets. For example, they calculated mean annual return (standard deviation in parenthesis) for the U.S., Switzerland and Italy are 7.2% (19.8%), 5.1% (18.9%), and 9.8% (32%), respectively. The numbers are a bit different from the ones reported in Table XI.6, though within the usual estimation error.

For emerging markets, the estimation error is considerable, given that quality data, following international standards, started to be collected in 1988 (Brazil, Greece, Ireland, Malaysia, Mexico, Thailand, etc), and for Russia, India and China, considered then the major "*frontier markets*," data started to be collected in 1993 (along with Israel, Pakistan, Poland, South Africa, etc). In Table XI.7, we report annual USD returns, standard deviation and Sharpe Ratio (using the U.S. T-bill average rate in the period, 2.43%) for the period 1993-2017 for some emerging markets, two emerging market indexes (EM-Asia and EM-Latin America), and, for reference purposes the U.S., World and EAFE Indexes.

In general, we observe the typical emerging market behavior: high returns and high volatility. In terms of Sharpe ratios, in Table XI.7, the U.S. market provided the best trade-off, closely followed only by the Russian market.

Market	Return	Standard	Sharpe
		Deviation	Ratio
Brazil	16.58	37.54	0.3768
China	5.40	33.25	0.0785
Greece	-0.18	35.46	-0.0736
India	12.05	28.99	0.3318
Malaysia	6.54	27.82	0.1477
Mexico	10.00	27.75	0.2728
Pakistan	6.79	34.91	0.1248
Poland	18.62	44.78	0.3615
Russia	22.65	50.09	0.4035
South Africa	11.30	26.30	0.3373
EM-Asia	7.24	24.13	0.1990
EM-Latin America	10.65	27.68	0.2969
U.S.	8.72	14.25	0.4409
World	7.06	14.44	0.3207
EAFE	5.48	16.06	0.1899

Table XI.7MSCI Index USD Annual Returns: (1993-2017)

We see a big dispersion in expected returns (and risk!) in international markets, which cannot be explained by the usual World CAPM. Several papers have been proposed to explain these differences, among them:

- Global economic risks –Ferson and Harvey (1994).
- Currency risk –Dumas and Solnik (1995).
- Inflation risk Chaieb and Errunza (2007).
- Momentum and a global cash-flow-to-price factor –Hou, Karolyi, and Kho (2011).
- ◊ Liquidity risk Karolyi, Lee, and van Dijk (2012), Malkhozov, et al. (2014).
- Investment restrictions -Karolyi and Wu (2014).
- Currency risk –Dumas and Solnik (1995).

There is also an international version of the 3-factor Fama-French model, extended by Fama and French (1998, 2012, 2015), which finds that only two factors matter in their model: world (say, a global equity benchmark) and value (HML). Fama and French (2015) favor a 5-factor regional model in a study of stock returns in 4 regions (North America, Europe, Japan and Asia-Pacific) from 1990 to 2015. They find that the 5-factor model tends to explain average returns (HML is the most important factor), but the model struggles to explain the behavior of average returns for small firms that tend to invest a lot.

<u>Note</u>: Having a good model that explains expected returns is not a trivial matter: We use risk-return models to estimate the cost of equity (k_e) and the cost of capital (k_c).

4.A.1 Moments in International Markets

As discussed above, in finance, we associate standard deviation with risk, and, thus, higher standard deviation is associated with higher expected returns. Recent research has found that higher moments also have information about expected returns.

Chang, Christoffersen, and Jacobs (2013) and Conrad, Dittmar, and Ghysels (2013) find that domestic stock traders are compensated when their cross-sectional domestic indices/stock portfolio returns have high volatility, low skewness, or high kurtosis. Skewness is associated with "*crash risk*," and kurtosis with "*tail risk*."

Country	Monthly Return	Implied Volatility	Implied Skewness	Implied Kurtosis
Euro Area	0.0003	0.1057	-0.9016	6.6929
Germany	0.0043	0.1669	-0.8655	7.2734
France	0.0019	0.1493	-2.0033	11.4318
Italy	-0.0029	0.2463	-2.5396	15.1776
UK	0.0001	0.2136	-1.5305	10.4403
Australia	0.0031	0.1935	-1.1564	7.8827
Switzerland	0.0035	0.1103	-1.0811	9.1301
Japan	0.0017	0.1894	-3.1633	31.4871
Sweden	0.0040	0.1460	-1.1022	7.4215
Spain	0.0003	0.1467	-0.6460	5.8272
Canada	0.0030	0.1402	-1.2425	8.3353
Brazil	0.0045	0.1846	-0.6298	6.5996
Mexico	0.0024	0.1575	-0.3518	4.1037
Korea	0.0067	0.1679	-0.2389	3.3512
Singapore	0.0042	0.2850	-2.5537	16.7907
Malaysia	0.0038	0.2271	-1.8902	13.3735
Taiwan	0.0044	0.1880	-2.0633	17.7618
Hong Kong	0.0064	0.1687	-1.5824	11.8461
US	0.0058	0.1936	-0.6456	9.8318

Table XI.8 MSCI Index USD Monthly Returns: (2006-2017) along with Implied Higher Moments

Shu-Hsiu Chen (2018) finds similar results in international markets. To calculate the higher moments, he uses option prices from ETFs representing 20 stock indices. The results are shown in Table XI.8. Chen (2018) also tried to forecast returns next month using this month implied skewness and kurtosis. He was successful in some markets (in particular, for both measures, Australia & Malaysia).

4.B <u>Why Do Investors Care about International Equity Markets?</u>

The case for international investing rests on a very simple argument: portfolio diversification. Diversification is a risk management tool. As long as one class of domestic assets is less than perfectly correlated with another class of domestic assets, a balanced portfolio that includes both classes of assets is likely to exhibit more stable performance over time. This argument leads to the conclusion that domestic investors should be well-diversified. This argument easily extends to foreign markets. International diversification, by increasing the number of markets and assets to invest in, provides an improved risk-return tradeoff. The case for international diversification remains as relevant for investors today as it was one hundred years ago.

Diversification is more attractive in international markets than in domestic markets. The benefits of diversification are driven by correlations. In general, the correlations across national markets are lower than the correlations across securities in most domestic markets.

Example XI.17: In Table XI.9 we calculate the cross-country correlation coefficients for monthly stock returns for the period January 1970 to February 2015 (542 observations). The returns are calculated from MSCI country indexes.

Δ Furon	ean Markets						- (/				
	MARKET	Bel	Den	France	Gerrn	Italy	Neth	Spain	Swed	Switz	U.K.	World
	Belgium	1.00	0.59	0.72	0.70	0.54	0.75	0.56	0.55	0.68	0.59	0.69
	Denmark		1.00	<mark>0.53</mark>	0.59	0.48	0.62	0.51	<mark>0.54</mark>	0.55	0.49	<mark>0.61</mark>
	France			1.00	<mark>0.73</mark>	<mark>0.59</mark>	<mark>0.73</mark>	<mark>0.59</mark>	<mark>0.57</mark>	<mark>0.68</mark>	<mark>0.63</mark>	<mark>0.73</mark>
	Germany				1.00	<mark>0.56</mark>	<mark>0.78</mark>	<mark>0.58</mark>	<mark>0.64</mark>	<mark>0.71</mark>	<mark>0.54</mark>	<mark>0.71</mark>
	Italy					1.00	<mark>0.55</mark>	<mark>0.57</mark>	<mark>0.50</mark>	<mark>0.50</mark>	<mark>0.57</mark>	<mark>0.57</mark>
	Netherlands						1.00	<mark>0.59</mark>	<mark>0.63</mark>	<mark>0.75</mark>	<mark>0.69</mark>	<mark>0.81</mark>
	Spain							1.00	<mark>0.57</mark>	<mark>0.50</mark>	0.47	<mark>0.62</mark>
	Sweden								1.00	<mark>0.57</mark>	<mark>0.52</mark>	<mark>0.69</mark>
	Switzerland									1.00	<mark>0.62</mark>	<mark>0.72</mark>
	U.K.										1.00	<mark>0.73</mark>
	World											1.00

TABLE XI.9

MSCI Indexes: Correlation Matrix (1970-2015)

B. Pacific Markets

MARKET	Australia	HK	Japan	Korea	Singap	Taiwan	U.S.	World
Australia	1.00	0.32	0.37	<mark>0.50</mark>	<mark>0.51</mark>	0.33	<mark>0.56</mark>	<mark>0.65</mark>
Hong Kong		1.00	0.34	0.40	<mark>0.57</mark>	0.41	0.39	0.48
Japan			1.00	0.48	0.39	0.24	0.36	<mark>0.67</mark>
Korea*				1.00	0.46	0.33	0.45	<mark>0.53</mark>
Singapore					1.00	0.45	<mark>0.53</mark>	<mark>0.60</mark>
Taiwan*						1.00	0.35	<mark>0.38</mark>

C.	North	American	Markets
\sim .	1,01,01	1 miler ream	maneeto

MARKET	Canada	U.S.	Mexico	World	EAFE	EM-LA	EM-ASIA
Canada	1.00	<mark>0.74</mark>	<mark>0.54</mark>	<mark>0.77</mark>	<mark>0.62</mark>	<mark>0.60</mark>	<mark>0.65</mark>
U.S.		<mark>1.00</mark>	<mark>0.58</mark>	<mark>0.88</mark>	<mark>0.62</mark>	<mark>0.57</mark>	<mark>0.61</mark>
Mexico *			1.00	<mark>0.5</mark> 6	0.49	<mark>0.72</mark>	<mark>0.52</mark>

Notes:

*: The sample for South Korea, Taiwan, Mexico, the EM-Latin America and the EM-Asia indexes start in January 1988.

You should note that, with some exceptions, returns correlations are moderate, with an average correlation of all the markets in Table XI.9 of 0.48. The exceptions tend to be geographically closed countries, like Belgium and Netherlands, or Germany and France. Economic integration and common economic policies play a big role. For example, the average intra-European developed market correlation is 0.57, while the average intra-Asian develop market correlation is 0.46. \P

Roll (1992) argues that the moderate correlations among international stock markets are partly attributable to the technical procedures of index construction. Some markets indexes have a small number of stocks (less than thirty) while others have a large number. Some national markets are industrially concentrated while others are very diversified. These diversification elements explain part of the observed intermarket difference in price index, not individual stock behavior.

Most stock market indices reflect the industrial structure of a country. We can think of the index from a country as analogous to a managed portfolio with particular industry sector "bets." Therefore, countries with different (and uncorrelated) industrial composition might display very low index intercorrelations.

Other economists disagree with Roll (1992). For example, Heston and Rouwenhorst (1994) present evidence showing that the low correlation between country indices is almost completely due to country specific sources of variation, not industrial structure.

We should also note that correlations are not constant. We tend to see that during periods of economic or financial crisis, correlations around the world increase. Figure XI.1 presents the correlation between Japanese and U.S. stock monthly returns, using a 1.5-year rolling window to calculate the correlation coefficient. For example, during the 2008 financial crisis the correlation between U.S. stocks and Japanese stocks increases to over .80. The average correlation between U.S. and Japanese stocks is close to 0.35.

Higher correlations during periods of crisis also occur at the domestic level. Between October 2008 and February 2009, at the height of the 2008 financial crisis, the average correlation of stocks in the S&P 500 was around .80%. When stocks rallied in 2010, the average correlation fell to 40%, then it spiked back over 80% during the European debt crisis.

The empirical fact that correlations tend to increase during periods of crisis is not a good one for the advocates of international diversification: when you really want to be diversified –i.e., bad times-, diversification does not work as expected!



4.B.1 Lower risk

Solnik (1974) was the first to quantify the risk reduction benefits of international equity diversification. Solnik shows that U.S. domestic portfolio volatility decreases as the number of domestic stocks increases, but asymptotically converges to a lower limit. This domestic lower limit is 27% of the average stock volatility in the U.S. For portfolios of the same size, using both U.S. and foreign stocks, the overall portfolio risk is substantially lower. The asymptotic lower (risk) limit is 11.7%.

Solnik's results have been verified many times, using different time periods and subsets of countries, with similar results. Solnik's findings had a very important effect on investors and money managers in the 1970s. In addition, in 1974 ERISA gave U.S. pension funds the freedom to invest overseas. These factors helped U.S. investors to start to think about internationally diversifying their portfolios.

4.B.2 Expected Returns are Unaffected

Lowering risk is only a part of the answer to the above posed question. For example, an investor can invest all his money in cash. This all-cash strategy has no nominal volatility, and therefore a lower volatility than a portfolio of stocks. The expected returns, however, are also substantially lower, and then an all-cash strategy provides no risk-adjusted benefits.

International diversification, on the other hand, seems to provide a "free lunch": it allows investors to lower risk at no opportunity cost. The rationale for this result is simple. Investors who extend their horizons to international markets can often find securities promising more rapid growth and more attractive valuations. Many economists make this observation a second argument for international diversification.

Example XI.18: During the period 1978-1993, adding foreign stocks to a U.S. stock portfolio increases returns by almost 1% and reduces volatility by almost 2%. The correlation between foreign stocks and U.S. stocks during this period was 0.42. ¶

The problem with the above studies and example is the use of "ex-post" returns. While variances and covariances are estimated with reasonable precision, expected returns are not (see the Appendix to the Review Chapter). In general, expected returns require long periods, on the order of decades, to obtain the required statistical accuracy.

But, similar numbers are obtained using longer time periods. For example, from 1970-2011, including 25% EAFE stocks in a U.S. portfolio increased returns by an average 2.1%, while decreasing volatility by an average 2.2%.

But, there is another reason to rely on long periods of time to make inferences about the benefits of international diversification. During short periods of time, the higher correlations during high volatility periods (usually, bear markets) can make international diversification inefficient. From Figure XI.1, it should be clear, that during the 2008 financial crisis, U.S. investors diversifying in Japanese equity markets did not enjoy the benefits of diversification. But, over long horizons, international diversification works. During the 1970-2001, including 25% Japanese stocks in a U.S. portfolio, increased returns by an average 8%, while decrease volatility by an average 3.2%. Using a comprehensive data set from 1950, Asness et al. (2010) show that international diversification pays off in the long run.

4.B.3 Staying at Home: The Home Bias

As mentioned in the Review Chapter, the lower the correlation between the assets, the greater are the benefits due to diversification. As we have mentioned above, international equity markets offer a domestic manager a wonderful opportunity to improve the risk-return profile of a domestic portfolio. The empirical evidence, however, displays a puzzle: domestic portfolios largely ignore international markets. This allocation reflects a so-called *home bias*.

French and Poterba (1991) and Tesar and Werner (1995) report that portfolio compositions based on actual data indicate a strong home bias. French and Poterba's (1991) estimates suggest that in 1989, Americans' foreign equity investment was less than 7% of the capitalized value of the U.S. stock market. A surprisingly low number, given that the U.S. share of the world equity market was close to 30% --if we look at the world GDP, we find a similar U.S. share. Tesar and Werner (1995) use data on international financial transactions across five OECD countries including the U.S., the U.K., Canada, Germany and Japan for the period 1979-1990. They find evidence of a home bias in portfolio compositions for investors in all the five countries they examine. While investors have increased their holdings of foreign stocks in recent years, the fraction of the portfolio choice. In 2002, a study done by UBS, reports the proportion of foreign bonds and foreign equities in the total equity and bond portfolio of local residents for several OECD countries. The most internationally diversified investors are in Netherlands (62%), followed by Japan (27%) and the U.K. (25%). At the bottom of the list was the U.S., with an 11% international share. More recent

studies found that the home bias has been decreasing, but it still significant. For example, Coeurdacier and Rey (2013) estimate the equity home bias (EHB) as:

In Figure XI.2, we report Coeurdacier and Rey's (2013) estimate of the EHB over time, since 1987. It is decreasing, but it is still significantly different from each region's share of the world GDP or world market capitalization.



Institutional investors also show a similar home bias, as shown in Figure XI.3, taken from J.P. Morgan Asset Management "Guido to the Markets –Asia."





Source: Ipreo, BNY Mellon, McKinsey Global Institute, J.P. Morgan Asset Management "Guide to the Markets - Asia."

It is interesting to note that the home bias is not limited to international portfolios. Investors tend to invest locally. Coval and Moskowitz (1999) showed that the preference for investing close to home also applies to portfolios of domestic stocks. Specifically, they showed that U.S. investment managers exhibit a strong preference for locally headquartered firms, particularly small, highly leveraged firms that produce non-tradable goods.

4.B.4 <u>Problems with International Diversification</u>

Many problems associated with international investing may explain the low correlations and the home bias. The main problems are:

(1) Currency risk.
 (2) Information costs.
 (3) Controls to the free flow of capital.
 (4) Country or political risk.
 (5) Cognitive bias

We have already studied the first problem, currency risk. It is really not a "problem," since currency risk can be managed with the different techniques studied in Chapters VI to VIII. Furthermore, currency risk can be diversified away in a well-diversified international portfolio. The second problem, however, is more difficult to control. Information costs includes not only the actual monetary costs of acquiring information, but the nonmonetary costs associated with understanding different cultures, accounting standards, legal environments, etc. We have discussed many of these points in Chapter XI. In the next two sections, we will two of the problems: capital controls and country risk.

The last problem, the cognitive bias, belongs to the field of behavioral finance. A *cognitive bias* is a pattern of deviation in judgment that occurs in particular situations, leading to perceptual distortion, inaccurate judgment, illogical interpretation, or what is broadly called irrationality. In the home bias case, domestic investors believe that they have better information regarding the value of domestic companies than they have for foreign companies. Investors tend to *over-invest* in markets (home markets) where they believe they have a comparative advantage. Thus, a home bias is created.

Field surveys conducted in 2003 and 2005 on Japanese institutional investors showed that they held relatively optimistic views for their domestic stock market than for the foreign stock market. Their one-year expected returns for the Nikkei Stock Average were on average much higher than those for the Dow Jones Industrial Average.

4.B.5 International Diversification through Multinational Corporations

Domestic or international multinational companies operate in many countries. In principle, MNCs are exposed to the domestic factors of the countries they operate. For example, in 1998, a company

in the Dow Jones Industrial Average now derives on average, about 40 percent of its revenue from outside the US, up from 35 percent in 1988. Thus, one might think that MNC stocks are good alternative to enjoy the benefits of international portfolio diversification. The evidence from U.S. MNCs suggests, however, that multinational firms do not provide all the benefits available from direct investment in foreign securities. Moreover, the evidence suggests that all MNCs do not even provide additional diversification benefits to a portfolio of purely domestic firms (i.e., a portfolio of MNCs have a higher SD than the S&P 500).

Jacquillat and Solnik (1978) examined firms from nine countries and found that MNC stock prices behave very much like those of purely domestic firms. Their approach was to formulate a multifactor market model, where each factor represents a national market index. In Table XI.10, we present their estimates of average betas for each country. Their results show that MNC stock prices are more strongly affected by domestic factors than foreign factors, in most cases. This is especially true for U.S. and British firms, where the addition of foreign factors to the domestic market does not significantly improve its explanatory power (R^2). This is less true for French, Swiss, Belgian and Dutch MNCs.

Nationality of MNC	National Index									Single	e Index	
	US	NL	BEL	GER	ITA	SWE	FRA	SWI	UK	R ²	beta	R ²
U.S. MNC	.94	.12	05	01	04	.04	.02	01	07	.31	1.02	.29
Dutch MNC	.31	.76	.09	.16	02	28	.25	21	06	.63	0.98	.50
Belgian MNC	27	.07	1.04	.06	.03	.19	.06	.08	.07	.58	1.03	.45
German MNC	.24	.03	21	1.18	02	01	.10	15	11	.74	1.18	.65
Italian MNC	10	.06	.10	.01	.83	.11	19	16	.20	.51	.91	.47
Swedish MNC	.06	15	02	.08	10	.96	.01	.15	.02	.50	.92	.42
French MNC	10	.14	.33	.18	.02	16	.95	22	.03	.62	1.08	.45
Swiss MNC	12	23	04	09	02	.16	11	1.74	.16	.75	1.39	.52
British MNC	10	11	.30	.09	04	13	09	.07	.84	.49	1.06	.44

TABLE XI.10Multifactor Market Model for MNC

Source: Jacquillat and Solnik (1978), Journal of Portfolio Management

Senchack and Beedles (1980) contrasted the risk, returns and betas of portfolios of multinationals with portfolios of domestic and international stocks and found that multinationals did not deliver diversification benefits.

In a more recent study, Rowland and Tesar (2001) find evidence that, over the 1984-92 period, multinational corporations may have provided diversification benefits for investors in Canada, Germany and the United States. They also find, however, that the addition of foreign market indices to a domestic portfolio - inclusive of multinationals - provides substantial diversification benefits in all countries.

The impact of national control and management policy, as well as government constraints on a firm's performance, may explain why multinationals are not a good substitute for international portfolio diversification.

4.C International Factors and Linkages

Recall that international investing involves a huge number of variables and factors. Investors would like to have this huge number of factors reduced to only a few key factors. If this were possible, it would greatly simplify the task of structuring a well-diversified international portfolio. The first step in this process is to determine whether the price of an individual security is primarily affected by international or purely domestic factors.

4.C.1 Domestic versus International Factors

Different studies have shown that domestic factors are more important than international factors. International industry effects appeared weak compared to national effects. A simple approach to determining the relative importance of each factor is to separately correlate each individual stock with

i.	the world stock index
ii.	the appropriate (international) industrial sector index
iii.	the currency movement
iv.	the appropriate national market index.

The first three factors may be regarded as international, and the last one as domestic.

Example XI.19: Solnik and de Freitas, in a paper published in **Recent Developments in International Finance and Banking** in 1988, performed the following experiment. They used monthly observations on a sample of 279 international firms from eighteen countries over the period December 1971 to December 1984. The country, industrial, and world indexes come from MSCI. The currency movement is that of the local currency relative to the USD. They regressed each individual stock on each factor and obtained its R².

Recall that a measure of correlation is the R^2 . The R^2 is a measure of correlation that tells us how much of the variability of the dependent variable is explained by the independent(s) variable(s).

Table XI.11 reports the average R^2 for all companies from a given country in the first four columns. The average R^2 for the multiple regression (multi-factor Market Model) is reported in the last column.

Market		All Factors			
	World	Industrial	Currency	Domestic	
Belgium	.07	.08	.00	.42	.43
Germany	.08	.10	.00	.41	.42
Norway	.17	.28	.00	.84	.85
Spain	.22	.03	.00	.45	.45
Sweden	.19	.06	.01	.42	.43
France	.13	.08	.01	.45	.60
Italy	.05	.03	.00	.35	.35
Netherlands	.12	.07	.01	.34	.31
U.K.	.20	.17	.01	.53	.55
U.S.	.26	.47	.01	.35	.55
Canada	.27	.24	.07	.45	.48
Australia	.24	.26	.01	.72	.72
Hong Kong	.06	.25	.17	.79	.81
Japan	.09	.16	.01	.26	.33
Singapore	.16	.15	.02	.32	.33
All	.18	.23	.01	.42	.46

TABLE XI.11Average R² of Regression on Factors

Note:

1. The various correlations do not add up; the four factors are correlated with each other.

2. The world factor and industrial factors explain an average of 18% and 23% of the variability of stock returns.

3. Domestic factors are the most important influence on stock returns.

4. The currency factor is almost negligible, with the exception of Hong Kong and Canada.

The simple regression of stock returns on the domestic market index return has an average R^2 of .42. When we add the three international factors, the average R^2 increases to .46. This is a rather small change in R^2 . However the story differs among countries; the increase is rather large for the U.S. and France.

A detailed analysis of the results indicates that the marginal contribution of the international factor is generally positive and significant. The marginal contribution of the currency factor is extremely weak but positive, and appears to be country specific but not company specific. A local currency appreciation tends to be good for the local stock market. ¶

Other studies have used different methodologies, however the results are similar. In an article published in the <u>Journal of Portfolio Management</u> in 1989, Grinold, Rudd and Stefek find that some industry factors are more "global" than others. For example, they found that the oil industry factor is highly significant, which is not the case of the factor for consumer goods.

4.C.2 <u>Currency Factor and Hedging</u>

In Example XI.19 we found that the currency factor on average was negligible. The average R^2 was .01, which indicates that only 1% of the variation in local currency is explained by changes in the exchange rates. The low explanatory power of the currency factor has currency hedging implications. If stock returns are independent of exchange rate changes, currency risk is not a systematic factor in the APT model and, then, is not priced in the stock market. That is, hedging currency risk cannot affect the systematic risk of multinational firms.

Jorion (1991) analyzes the importance of the currency factor using a simple CAPM model with a currency factor added. He also uses a similar APT model than the one used by Solnik and de Freitas. Jorion uses more sophisticated tests and obtains a similar result as Solnik and de Freitas: the currency factor is already incorporated into the other factors. Therefore, currency risk is diversifiable and is not priced in aggregate in the stock market.

Jorion also analyzes the importance of the currency factor at a disaggregate level. Jorion finds that different firms and industries have different and significant exposures to the currency factor. Exporters tend to benefit from a depreciation of the domestic currency, while importers tend to benefit from an appreciation of the domestic currency. In another paper published in the <u>Journal of Business</u> in 1990, Jorion finds that the sensitivity of a U.S. firm's returns to the currency factor is positively related to its percentage of foreign operations.

4.C.3 Linkages among Stock Markets

As it was mentioned in Section I, the positive but moderate correlation coefficients in international stock markets are the main reason behind internationally diversifying portfolios. The low correlation in some markets is surprisingly low, given the increasing global financial integration.

The analysis of correlation coefficients might not be the correct tool to study the issue of linkages between international markets -or the issue of integration versus segmentation. For example, one could conceive of a situation where no movement of capital is allowed between national stock markets, but common shocks to growth or monetary policies induce positive correlations between the two markets. In such a case, *ex ante*, or expected, returns could be very different across markets, even with highly correlated *ex post*, or realized, returns. Thus, it is very useful to study the linkages among international stock markets without focusing on the correlation coefficients.

Big and unusual stock market movements ("extreme events") seem to drive markets together. During these events all markets move together in the same direction and with similar changes. The Crash of October 1929 is one of these events. Another event that highlighted the links between international stock markets during big market movements was the Crash of October 1987. The Crash of October 1987 is a recent and very well studied event, which might provide an opportunity to understand international linkages. In the next section, we will analyze the Crash of October 1987 and its consequences.

3.B.3.i Extreme Linkages: The Crash of October 1987

Roll (1989) points out that the October 1987 Crash was the only month during the 1980's where all the stock markets around the world moved in the same (negative) direction. The international transmission of the crash started in non-Japanese Asian countries and continued through European markets, the U.S. and finally Japan.

In Table XI.11, we reproduce the daily returns during the Pre-Crash period, the Crash period and the Post-Crash period by country.

	Daily Returns (perce	ni/day) by Country	
Country	1/2/87-10/12/87	10/12/87-10/30/87	11/2/87-3/31/89
Australia	.2239 (0.850)	-3.5160 (8.315)	.0475 (1.216)
Hong Kong	.2218 (1.121)	-5.4174 (12.072)	.1083 (1.353)
Japan	.1543 (1.274)	-0.9777 (5.567)	.0810 (0.946)
Malaysia	.2821 (1.171)	-3.6080 (6.026)	.0128 (2.754)
N. Zealand	.0291 (1.091)	-2.0473 (5.296)	0755 (1.366)
Singapore	.2508 (1.075)	-3.9675 (10.182)	.1004 (1.327)
Austria	0202 (0.736)	-0.8255 (1.663)	.0699 (0.557)
Belgium	.0808 (0.814)	-1.6531 (4.316)	.0906 (0.965)
France	.0114 (0.920)	-1.6526 (4.568)	.1018 (1.254)
Germany	0296 (1.251)	-1.5913 (4.178)	.0254 (1.292)
Italy	0338 (1.017)	-1.3943 (3.184)	.0293 (1.149)
Netherlands	.0672 (0.993)	-1.5985 (5.296)	.0633 (1.301)
Spain	.2143 (1.276)	-2.4154 (3.286)	.0555 (0.927)
Sweden	.1272 (1.009)	-1.8998 (4.534)	.1202 (1.242)
Switzerland	.0156 (0.917)	-2.0706 (5.409)	.0025 (1.305)
U.K.	.1852 (0.865)	-2.0759 (4.947)	.0524 (0.962)
Canada	.1143 (0.689)	-1.5150 (5.413)	.0405 (0.772)

TABLE XI.12 Daily Returns (percent/day) by Country

Mexico	.9831 (2.509)	-3.4050 (6.892)	.0128 (2.754)
U.S.	.1213 (0.965)	-1.4128 (7.253)	.0428 (1.094)

Notes to Table XI.12: Standard deviation in parenthesis.

There is a major question of interest: what were the causes of the Crash? Roll (1989) analyzes four candidates that were extensively discussed after the Crash by academic researchers, politicians and journalists:

(1) Portfolio insurance and computer systems?

Just after the Crash, many journalist and politicians blamed the Crash on a variety of sources ranging from portfolio insurance to inadequate computer systems. Empirical studies have found these claims totally unfounded. For example, many studies have found that markets with portfolio insurance crashed less than markets without it.

(2) Futures markets?

Another allegation points to all uses of stock index futures or other related futures contracts, not just portfolio insurance. The argument seems to be that irrational speculators cause instability. However, stock markets with related futures markets crashed in the same way as countries without futures exchanges.

(3) *Specific event?*

The search for a triggering event has been very unsuccessful. Several reasons have been advanced in the U.S.: announcement on October 14 of a worse than expected trade balance, poor performance of Asian markets in the week before the Crash, etc.

The most likely event was the introduction in the U.S. Congress of a tax bill that would have severely penalized corporate takeover, leverage buyouts, and other similar activities.

The evidence for this event is the most persuasive for all the events advanced; however, it is difficult to believe that it had such an extraordinary effect in other markets.

(4) Speculative bubble?

Eugene Fama, from the University of Chicago, says that the most questionable aspect of 1987 was not the Crash itself, but the incredible market advance during the previous five years. There is strong evidence that fundamental factors from January through September of 1987 could not explain such large increases as were observed in the U.S. The same seems to be true for other markets.

Example XI.20: Go back to Table XI.12. The rate of return from January 1, 1987 to October 9, 1987 was 37.62% for the U.S., 44.45% for the U.K., 36.12% for Japan, and a spectacular 687% for Mexico. ¶

This apparent behavior has been attributed to a *speculative bubble*. Under this view, the most plausible theory for the Crash is that a speculative bubble burst in October 1987.

♦ A Bubble at Work: The South Seas Bubble

In March 1711 the Chancellor of the Exchequer announced to Parliament plans to convert the National Debt, then GBP 9 million, into shares in a joint-stock company called "The Governor and Company of Merchants of Great Britain trading to the South Seas and other parts of America, and for the encouraging of the Fishery." This company was better known as the South Seas Company. In exchange for GBP 9 million, the South Seas Company was going to receive a 6% annual payment from the government, plus the monopoly rights to trade with South Seas territories. The issue was quickly fully subscribed. Within four years the capital of the company was increased to GBP 10 million. By 1717, nearly half of the wealth of the country was invested in the company. In 1720, Sir John Blunt, a well-known banker and also director of the South Seas Company, proposed to the Government a merger with the remaining National Debt -at that time GBP 31 million. In April 1720, the Parliament approved this idea and the South Seas Act was passed. Within days of the Act receiving royal assent, the company announced its first "money subscription" at a price of GBP 300 for GBP 100 par. After several promises from the company of dividends of 30% annually and even 50% annually, the issue was oversubscribed. Approximately GBP 1.5 million was subscribed in less than a day -even the King and the Prince of Wales bought stock at 400%. The interest in this company was such that other "bubble" companies were set up. It was calculated that the value of all these bubble companies, valued at market prices, was close to GBP 500 million -five times the value of all the cash in Europe. The bubble soon burst.

Some investors made huge profits with the bubble, like the Prime Minister, Sir Robert Walpole, and the Prince of Wales. Others were ruined. After the collapse of the South Seas shares, the Bank of England and the East India Company took over the South Seas Company, and its shares traded for another 100 years. The company, however, was never successful.

As a result of the South Seas bubble, the British government put severe restrictions on joint stock issues. These restrictions left two insurance companies, the Bank of England, the East India Company and what remained of the South Seas Company as the main components of the English stock market for the rest of the century.

Another result of the South Seas bubble was a long poem written called "The Bubble" by Jonathan Swift, the author of *Gulliver's Travels*, published in January of 1721. The poem included the following line:

While some build Castles in the Air, Directors build 'em in the Seas; Subscribers plainly see 'um there, For Fools will see as Wise men please.

It is difficult to test for bubbles. It is very difficult to measure the structure of the speculative bubble. Some popular tests are based on the structure of the autocorrelations. During a speculative bubble, the degree of serial correlation could be highly non-stationary, swinging up and down and yet still being positive during most of the bubble's expansion. (Traditional methods, like the Q test, usually assume stationarity and they may have weak detecting power as a consequence.) Several studies have used non-standard tests (two popular test are the so-called variance ratio test and the BDS -Brock, Dechert, and Sheinckman- test) and have dismissed it as a plausible explanation for the October 1987 Crash.

• Can a Crash be avoided?

The immediate consequence of the Crash was a couple of reports by official agencies, the most famous one is the report by the Presidential Task Force on Market Mechanisms. Not surprisingly, these reports call for more controls and regulations, especially of futures markets. The objective of these measures is to reduce volatility.

The proposed measure included:

- (1) Increase in margin requirements.
- (2) Imposition of price limits.
- (3) Differential taxing for short and long positions.

There is no evidence that margin requirements or price limits have any impact on stock price volatility.

The Crash was an international event. In Table XI.10, we have countries with different regulations, controls, taxes and trading systems. However, all experienced a significant negative shock in October 1987. ◆

4.C.4 <u>Average Linkages</u>

We know, from the previous section, that markets display similar movements during periods of extreme stock market movements. We also know that on average correlations are low to moderate. Are there any patterns in those correlations? Some studies have pointed out certain regularities. Big movements (not of the extreme kind) increase the correlation between international markets. There seems to be a lead-lag relation between the U.S. market and the rest. Markets around the world seem to pay close attention to the U.S. market open. An important question for investors and traders is the following: are changes in stock markets related across time? For example, if there is a big (surprising) change in the U.S., do we expect a similar change in Japan, the next day? That is, the nature of correlations among international markets might be very important for investors. We should already suspect that the answer to this question has very important portfolio implications.

4.C.4.i <u>Big Movements, Higher Correlations</u>

When price changes are moderately big, transaction costs become relatively unimportant. Transaction costs are a barrier for instantaneous arbitrage. Therefore, big price changes will bring world markets together.

Example XI.21: DuPont and IBM are U.S. stocks with listings on the Tokyo and the London exchanges. From October 21, 1987 to June 15, 1988, the stock movements were tightly linked across international markets only if the price movement was bigger than the transaction cost. For example, if the price movement

was bigger than the roundtrip transaction costs, the response to a change in Tokyo or London exchanges in the NYSE was one to one. If the price movement was less than the roundtrip transaction cost, the response was close to zero. \P

Cross-market correlations tend to be positively correlated with measures of price volatility.

4.C.2.ii Leads, lags and the U.S. market open

In a study published in the <u>Journal of Financial and Quantitative Analysis</u>, in 1989, Eun and Shim examine the international transmission mechanism of daily movements of stock prices by estimating a vector autoregressive (VAR) model of nine major stock markets. A VAR model is a simultaneous equation model where all the variables are considered endogenous. The explanatory variables are lagged endogenous variables. This approach allows us to decompose returns into a component due to previous domestic innovations, and a second component representing previous foreign returns.

Their result shows that a substantial part of daily movements in innovations is attributable to other countries. On the other hand, the magnitude of the impact by those countries is not symmetric; the U.S. market is found to be by far the most influential country.

The Eun and Shim (1989) study uses daily data. Using daily data has a disadvantage, some markets in the world have overlapping trading hours. It is very difficult for some markets to distinguish what is a common movement (caused by world factors) and what is the influence of a specific international market. Therefore a positive co-movement between NY and London (they share 2:30 hours of trading) might either reflect common information or the influence of one specific market in the other.

In other studies, using hourly data, a U.S. market opening effect has been discovered. The intra-daily evidence between New York and London is that they only affect each other around the time New York is opening (9:30 AM, EST). At all other times, they behave like independent units. There is evidence for an opening effect connected to NYSE.

4.C.3 Application: High Volatility, Correlations and Portfolio Choice

As we have seen above, in Section I, the home bias is a puzzle. The papers that discovered the home bias puzzle examine gains to diversification using a time invariant correlation structure. Changes in the correlation structure, no doubt, will affect the composition of optimal portfolios across time. Bicksler (1974) shows that if correlations among international stock markets change over time, the gains from international portfolio diversification may not necessarily be realized. As we have discussed in Chapter V, variances and covariance are time-varying and ARCH models are popular ways to model them. Several articles find that, in general, international correlations are unstable over time.

As discussed above, in this Section, higher interrelations are found when markets are more volatile. Karolyi and Stulz (1995) find that while co-movements exhibit day-of-the-week effects, macroeconomic shocks do not adequately explain these co-movements; neither does controlling for

industry effects. More importantly they find that covariances are high when returns on the national indices are high and when "markets move a lot."

The above results suggest that while variances and covariances across markets are changing over time, the spillover effects are also a function of the magnitude of the volatility shocks. In other words, variances, covariances and correlations could be both time and state varying.

In Table XI.13, the correlations between the U.S. and other major markets are calculated for two U.S. volatility regimes: high volatility and low volatility. In other words, using the U.S. market as the home market and based on the state of the variance of the home market return, the correlation between the home and foreign markets is calculated. The results show that except in the case of Italy and Sweden, higher correlations between the U.S. and other major stock markets are associated with periods of high domestic volatility and vice versa. On average the correlations are 1 to 2.6 times higher in the U.S. high volatility state.

The last column of Table XI.13 also provides an indication of the proportion of times that a positive foreign market return would have hedged a negative U.S. return when the U.S. is in a high volatility regime. For instance, a positive return on the U.K. market would hedge a negative return in the home (U.S.) market about 11% of the time when the home market is in the high volatility state. Similarly, a portfolio with the U.S. and the world weighted in terms of market capitalization would have provided no risk reduction benefits to a U.S. investor when the U.S. is in a high volatility regime.

As the U.S. investor is concerned, the benefits of diversification change depending on the state of the volatility structure. For example, during the U.S. high volatility state, the correlation between U.S. and EAFE returns significantly increases, but since the EAFE volatility is below the U.S. volatility, the EAFE weight significantly increases. This result might explain a finding reported by Tesar and Werner (1995). They point out that one would expect that U.S. investors would decrease their purchases of equity from a market when that market covaries more strongly with the U.S. market. Tesar and Werner, however, cannot find evidence for such a pattern in the data, which is consistent with the above findings.

The results discussed above do not provide a complete explanation of the home bias phenomenon. If investors, however, forecast that during high volatility periods the correlations increase, but the foreign market variance increases more than the domestic variance, the portfolio weights would show an "ex-post" home bias.

TABLE XI.13

	High volatility	Low volatility	% Hedging
U.K.	0.7251	0.3124	11.11%
Germany	0.4275	0.2546	22.22%
Japan	0.2400	0.2344	22.22%
Canada	0.7983	0.6386	2.78%
Spain	0.2775	0.1481	19.44%
France	0.5471	0.2079	22.22%
Hong Kong	0.3208	0.2144	22.22%
Australia	0.2400	0.2344	19.45%
Denmark	0.3103	0.1980	16.67%
Belgium	0.3937	0.2114	22.22%
Italy	0.1160	0.1632	30.55%
Netherlands	0.7382	0.4454	19.44%
Norway	0.4735	0.2873	27.78%
Singapore	0.3762	0.2105	19.44%
Sweden	0.1730	0.2095	13.88%
Switzerland	0.5763	0.3318	13.88%
EAFE	0.5098	0.3474	11.11%
World	0.8628	0.7658	0.00%

Correlations between the U.S. and other markets in the two volatility regimes

V. Looking Ahead

We have studied the major differences among national stock markets. Stock markets tend to have different rules, legal frameworks, taxes, and cultural practices. These issues might affect the informational content of equity prices. In some markets obtaining reliable information is expensive and difficult. Investing in foreign equity also involves country risk. Given these problems and costs, many investors may not see the real attraction of international stock markets: great diversification. In the next chapter, we move to a different asset class in international markets: bonds.

Related readings:

A nice description of different market structures and their implications is in **The Microstructure of Securities Markets**, by K.J. Cohen, S. Maier, R. Schwartz and D. Whitcomb.

In Chapter 13 of **A Random Walk down Wall Street**, by Burton Malkiel, there is a clear exposition of the passive and active approach.

For an overview of stock market automatization see "Automating the Price Discovery Process: Some International Comparisons and Regulatory Implications," by Ian Domowitz, in the <u>Journal of Financial Services Research</u>, 1992.

For an applied approach to Mutual Funds and their methods, read **How Mutual Funds Work**, by Albert J. Fredman and Russ Wiles (international funds are in Chapter 7).

For a broad overview of international accounting practices, see **International Accounting**, by F.D. Choi and G.G. Mueller.

Ang, A., A. A. Shtauber, and P. C. Tetlock (2001), "Asset Pricing in the Dark," working paper, Columbia University.

Campbell, John Y., and Robert J. Shiller (1998). "Valuation Ratios and the Long-Run Stock Market Outlook," *Journal of Portfolio Management*, vol. 24, no. 2, pp. 11-26.

Fan, J., and Wong, T. (2002). "Corporate Ownership Structure and the Informativeness of Accounting Earnings in East Asia. Journal of Accounting and Economics, 33, 401-425.

Lang, M., K. V. Lins and M. Maffett (2009). "Transparency, Liquidity, and Valuation: International Evidence," working paper, UNC.

Leuz, C., D. Nanda, and Wysocki, P. (2003). "Earnings Management and Investor Protection: An International Comparison," Journal of Financial Economics, 69: 505-527.

Exercises:

1. A Mexican investor buys 5,000 shares of GE on January 6, 2015 on the NYSE at USD 30.50. The exchange rate is 17.50 MXN/USD. Over the year, the investor receives a gross dividend of USD 0.92 per share; the net dividend per share received is equal to USD 0.782 because of a 15% withholding tax levied by the U.S. The exchange rate at the time of dividend payments is 8.90 MXN/USD. On February 15, the investor resells the shares at USD 31.25. The exchange rate has dropped suddenly to 16.20 MXN/USD. Ignoring commissions, what is the rate of return on the investment (in USD and in MXN), gross and net of taxes. Our investor is taxed at 40% on income and 15% on capital gains; the U.S. withholding tax can be used as a tax credit in Mexico.

2. Newly privatized Latin American firms such as oil giant Petrobras have larger trading volume in New York, where they trade as ADR, than in their home stock exchange. Propose an explanation for this empirical fact.

3. Suppose you have the following data (January 1980- July 1994) from MSCI: the 90 days Treasury Bill rate, ten country indexes, the World Index and the excess home currency return on an asset that is riskless in terms of the currency of each country. How would you test the mean-variance efficiency of the World Index?

4. A Jensen measure, with respect to the FT-World Index, for an international money manager is .354. The standard error of this estimate is .201. Is the managed portfolio outperforming the FT-World Index?

5. It is July 17, 2015. The DAX closed at 11,673. Ms. Chambers manages a German portfolio valued at EUR 12 million. Ms. Chambers' portfolio has β =.89. She is concerned about a possible drop of the German stock market during the next two months. She does not want the value of her portfolio to drop below EUR 8 million. She decides to use DAX index put options to establish a floor. On July 17, 2015, the September put option with a strike price of 11,000 is trading at 81. (The DAX multiplier is EUR 5.) Ms. Chambers has estimated that b = 3933.

(1) Determine the number of options needed to establish a floor for Ms. Chambers' portfolio.

- (2) Determine the cost of the insurance.
- (3) For different scenarios for the DAX, show that the floor works.

6. You want to calculate the P/E ratio for the U.K. market. Assume that real economic, long term, trend growth (g) is 2.5% a year. Assume that the real bond yield is 3% and the risk premium is 3.5%. Calculate the steady state P/E ratio.

7. It is April 2015. The U.K. economy is very advanced in the business cycle. According to British expert, the earnings estimates for the FTSE-100 are in the range of 600-650. The FTSE-100 is trading around 7000. Adjust accordingly the steady state P/E ratio, calculated in Exercise 6, to determine if the U.K. market is overvalued.

8. Suppose JRV Corp is considering a project in Colombia (T=5 years), which requires an investment of COP 2000M (COP: Colombian peso). JRV is planning to use the usual 70/30 D/E

split. Colombia has a 25% effective corporate tax rate. To calculate the cost of capital, JRV gathers the following data (all annualized):

JRV can borrow in Colombia at 8% and in the U.S. at 2.5%. 5-year government (risk-free) rates: 6.5% in Colombia and 1.5% in the U.S. Effective corporate tax rate in Colombia: 25% Expected Colombian stock market return: 13% U.S. stock market return: 8% Beta of project: 1.3 $E[I_{Col}] = 5\%$ $E[I_{US}] = 2\%$ Stock market volatility: 35% in Colombia, 15% in the U.S. Bond market volatility: 26% in Colombia, 12% in the U.S.

a. Using WACC, calculate the cost of capital for the Colombian project.

b. Suppose JRV does not trust the expected return reported for Colombia and decides to use the Relative Equity Market Approach to estimate the Colombian risk premium $(k_M - k_f)$. Recalculate the cost of capital for the Colombian project.

c. JRV believes the project would not have full exposure to Colombian country risk, since 80% of its production would be exported to the U.S. Assume that exports contribute 18% to Colombian GDP. Recalculate the cost of equity and the cost of capital under this scenario.

9. Suppose you work for the investment consultant CFS following the ADRs of Grupo Aval Acciones y Valores (NYSE:AVAL), Colombia's largest holding company, which recently went public in Bogotá and in New York. After fifteen years of growth and better prospects for peace with armed guerrilla groups, Colombia is considered one of the Latin America's most appealing emerging markets, though it has recently shown some growth pains.

It is January 6, 2015. AVAL does not have a long history, its IPO was held on September 23, 2014. Its EPS in 2016 are projected to be USD 0.65, while the estimated EPS in 2017 are USD 0.69. The estimate for the annual dividend in 1996 is USD .39, for an estimated dividend yield of 6%. Many analysts believe that the short-term dividend growth rate will be 0%. Given the global economic problems, you believe that this level will be maintained for another two years. After that, you expect the company's dividend growth rate to revert to the long-term growth forecast level, which you estimate to be 10%.

CFS estimates required rates of return using CAPM. You have the following inputs: $\beta_{AVAL}=1.05$; rf =.06; E[r_m]=.13.

Analysts believe the USD will appreciate at an average rate of 15% a year against the Colombian peso (COP) for the next two years. After that, analysts predict a 4% depreciation of the COP against the USD for the foreseeable future.

On January 6, 2015, the closing price on NYSE for AVAL was 6.30, while the exchange rate was 3,225 COP/USD. What is your recommendation for AVAL: a buy, a hold or a sell?