International Investments

BRUNO SOLNIK

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Bruno Solnik
Hautes Études Commerciales—Institut Supérieur des Affaires

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Preface

International investment is growing rapidly among private and institutional investors. The deregulation of most national markets leads the way to an integrated world capital market. In 1986 foreign organizations and banks were allowed to become members of the Tokyo and London stock exchanges. Each of the large international banks employs a staff of a few hundred investment bankers in London, the leading international financial center.

Foreign investment restrictions imposed on pension funds and other institutional investments are also being progressively relaxed throughout the world. As an example, the value of foreign assets held by U.S. pension funds multiplied by a factor of one hundred from 1976 to 1986 to reach $30 billion. Simultaneously, official statistics indicate that the annual net purchase of U.S. securities by foreign investors has multiplied by twenty to reach $80 billion in 1986. Foreign investment by Japanese and British institutions also grew at a rapid pace, and continental Europeans have long been international investors by cultural heritage as well as necessity, given the small size of each country.

However, international investment is not an easy achievement. It requires a familiarity with foreign cultures, financial instruments, and markets. Financial traditions vary across the world and strongly influence the organization and functioning of markets. A global investor must obtain information from different sources and be able to interpret it. Regulations, dealing practices, taxes, and costs complicate the investment process. The multi-currency dimension must be dealt with. All these aspects must be taken into account in structuring an international investment approach. The purpose of this book is to provide concepts, techniques, and institutional information to assist the reader in this task.

Chapter 1 presents the international environment. It provides both a theoretical and an empirical analysis of the basic economic aspects of the international capital market. Chapter 2 presents the case for international investment, its pros and cons.

The next nine chapters review the major investment vehicles, the instruments, the markets, as well as the concepts and the techniques used to analyze those investments. Chapter 3 deals with foreign exchange and its related markets, and it focuses on exchange rate determination. Chapter 4 describes the stock markets in the world, while Chapter 5 studies the concepts and techniques used in international equity investment and focuses on asset pricing in an efficient international market. In turn, Chapter 6 describes the world bond market, while Chapter 7 studies the concepts and techniques used in international bond portfolio management. Speculative investments such as futures and options are described in Chapters 8 and 9, which stress their use in global portfolio management. The specific issue of currency risk management is discussed in Chapter 10. A Frenchman could not avoid spending a chapter on gold: Chapter 11 studies real assets such as gold and all the various investments that are linked to gold. The final chapter (12) is devoted to the practical implementation of a global investment strategy. It attempts to incorporate the various concepts introduced earlier into an integrated approach from conception to performance measurement.

A basic investment course is a useful prerequisite to this text. Some knowledge of international economics may also be of help in the early chapters. Some familiarity with discounting techniques and basic statistics (e.g., standard deviation, correlation) will make some of the chapters easier to read. However, this book is intended to be accessible to students and portfolio managers without recent training in portfolio theory. Concepts and theories are presented with a focus on their practical relevance rather than on their mathematical formulation. The more advanced sections are put in appendixes.

This book is the result of fifteen years of teaching international investment to students and executives on four continents. My interest in this topic started with my doctoral dissertation at the Massachusetts Institute of Technology, and I am grateful to my former teachers R. Merton, F. Modigliani, S. Myers, G. Pogue, and M. Scholes. I also owe a special debt to many colleagues at universities where I taught international investment: Stanford, Berkeley, École Polytechnique, Université de Genève, and Centre HEC-ISA (CESA). In times when international diversification was often regarded as an exotic idea, several organizations have supported me in spreading the *bonne parole*. Special thanks are due to N. de Rothschild (Banque Rothschild), D. Nichol (Ivory Sime), J. Twardowski (Frank Russell and Q Group), G. Stevenin (Rondeleux Oudart), K. Mathysen Gerst and P. Keller (Lombard Odier), R. Toigo (IFE), F. Grauer (Wells Fargo), C. Nowakowski (Intersec), J. D. Nelson and David Umstead (State Street Bank), F. s'Jacob and R. Van Maasdyck (LOIPM), and S. Fukabori (Kokusai).

From my association with Lombard Odier, I discovered that no theory could ever reflect the complexity of international finance, but also that many ideas and techniques presented in this book could provide valuable assistance to investment management. Thierry Lombard provided constant stimulation for this book, and Patrick Odier contributed so much that he came close to becoming a coauthor.

R. Samuelson provided magnificent editing assistance equaled only by the typing work of G. Yonner and her staff.

My final words are for my wife, Catherine, who suffered through my sixth book (four in French and two in English). She has now enjoyed all the exciting aspects of the leading financial cities of the world and the top ten hotels of *Institutional Investor*'s list, with the exception of those located in Paris. She also shared numerous sleepless, interminable airplane hauls and middle-of-the-night phone calls from Hong Kong, Tokyo, or San Francisco. Let this book add to the long list of pleasures and suffering we happily share.

Paris Bruno Solnik

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The Economics of the International Environment

International investment is rapidly growing throughout the world. United States investors are attracted by its risk diversification benefits as well as the better performance provided lately by many non-U.S. markets. As can be seen in Chapter 2, the performance of the U.S. stock market has been well below that of foreign stock markets for the past ten, twenty, or thirty years. The same applies to bond markets. For example, the U.S. stock market registered an average annual return of 9.47%, including the dividend yield, from 1970 to 1985. Over the same period, the Morgan Stanley Capital International EAFE index, which is a market-capitalization-weighted index of non-American stock indexes, had an average annual dollar return of 14.19%. This means that a typical U.S. portfolio yielded a total return of 285% from 1970 to the end of 1985. Over the same period a well-diversified non-American portfolio had a total return of 623%, a German stock portfolio had a total return of 750%, and a Japanese stock portfolio had a total return of 1,556%, all in U.S. dollar terms. Some emerging markets such as Hong Kong had an even higher performance.

International investment is not an easy achievement. Investing abroad may come as a cultural shock: there are marked differences in institutions, sources of information, trading procedures, reporting, and many financial traditions that often find their roots in the national cultures of each country. One of the objectives of this book is to make the reader sufficiently familiar with foreign markets and procedures. However, other impediments to international investment exist besides the technical and cultural knowledge required. These constraints are discussed in Chapter 2 and are detailed throughout the book; they include psychological barriers, legal restrictions, transaction costs, discriminatory taxation, political risks, exchange risks, etc. The existence of different numeraires throughout the world is the major constraint. Prices of foreign assets must be converted into the home currency using exchange rates.

Exchange rate uncertainty adds an important dimension to the economics of capital markets. Returns on foreign investments are directly affected by currency movements because they must be translated from foreign to domestic currencies. They are also indirectly influenced by the reaction of asset prices to exchange rate adjustments. Indeed, asset prices, interest rates, and foreign-exchange rates are interrelated in a complex manner.

The purpose of this chapter is to present the various building blocks of the international market structure. The first section reviews basic economic parity relations linking monetary variables such as foreign-exchange, interest, and inflation rates. This set of parity relations provides a most useful framework for investment analysis. The second section addresses the influence of monetary variables on equity and bond prices. The final section is devoted to asset pricing in international capital markets.

While theory is not the major objective of this book, a minimal familiarity with the major conceptual issues is required before getting to the practical aspects of international investment. It helps to understand how to structure investment analysis and management in the complex international setting. This global view of the investment structure is a prerequisite to the detailed study of the various investment vehicles presented later, and their integration in a disciplined and consistent international investment process.

INTERNATIONAL PARITY RELATIONS: INFLATION RATES, INTEREST RATES, AND EXCHANGE RATES

Short-term fluctuations in exchange rates seem to be generated by a large variety of economic events. Before presenting some of the basic models of exchange rate determination in Chapter 3 it may be useful to recall the well-known international parity conditions linking domestic and foreign monetary variables: inflation rates, interest rates, and foreign-exchange rates. These relations are the basis for a simple model of the international monetary environment, which is quite useful for analyzing the relationships among the various domestic and foreign monetary variables and their influences on asset prices. After presenting the model we shall discuss the empirical validity of the various building blocks, which rely on some key assumptions such as perfect trade and perfect certainty.

The variables that appear below are

The spot exchange rate, S. This is the rate of exchange of two currencies. It tells us the amount of foreign currency that one unit of domestic currency can buy. *Spot* means that we refer to the exchange rate for immediate delivery. For example, the French franc/U.S. dollar spot exchange rate might be $S = 8.00$ indicating that one U.S. dollar is worth eight French francs.

The forward exchange rate, F. This is the rate of exchange of two currencies set on one date for delivery at a future specified date. For example, the French franc/U.S. dollar forward exchange rate for delivery in one year is 8.2909

French francs per U.S. dollar. Spot and forward exchange markets are described in Chapter 3.

The interest rate, r. This is the rate of interest for a given time period. Interest rates are a function of the length of the time period and the denomination of the currency. Interest rates are usually quoted in the marketplace as an annualized rate. For example, the one year rate on U.S. Treasury bills might be $r_{\$} = 10\%$ while the one year rate on French franc bills might be $r_{FF} = 14\%$. In this case the *interest rate differential* is equal to 4% ($r_{FF} - r_{\$} = 4\%$).

The inflation rate, I. This is equal to the rate of consumer price increase over the period specified. The *inflation differential* is equal to the difference of inflation rates between two countries. For example, if the inflation in France is $I_{FF} = 12.87\%$, while it is $I_{\$} = 8.91\%$ in the United States, then the inflation differential over the period is approximately four percent.

The theoretical parity relations of international finance[1] are

1. The *purchasing power parity* relation linking spot exchange rates and inflation.
2. The *international Fisher* relation linking interest rates and inflation.
3. The *foreign exchange expectation* relation linking forward exchange rates and expected spot exchange rates.
4. The *interest rate parity* relation linking spot exchange rates, forward exchange rates, and interest rates.

The Theory

Purchasing power parity

Purchasing power parity[2] is a well-known relation in international finance. It states that spot exchange rates adjust perfectly to inflation differentials. If goods prices rise in one country relative to another, then the country's exchange rate must depreciate to maintain a similar real price for the goods in the two countries. This argument is obvious for internationally traded goods with no trade restrictions. Let's consider the following scenario: The French franc price of wheat rises by 12.87%, the French inflation rate, while the U.S. dollar price of wheat rises only by 8.91%, the U.S. inflation rate. If the French franc depreciation does not offset this 4% inflation differential, it will make French wheat less competitive in the international market and induce trade flows from the United States to France to take advantage of the price differential. If trade could take place instantaneously, at no cost, and with no impediments, one would expect the exchange rate to exactly offset any inflation differential. The purchasing power parity relation might be written as follows:

$$\frac{S^1}{S^0} = \frac{1 + I_F}{1 + I_D} \tag{1.1}$$

where S^0 is the spot exchange rate at the start of the period (the foreign price of one unit of the domestic currency),
S^1 is the spot exchange rate at the end of the period,
I_F is the inflation rate, over the period, in the foreign country, e.g., France, and
I_D is the inflation rate, over the period, in the domestic country, e.g., the United States.

Using the figures given previously for our French/American illustration the end-of-period spot exchange rate should be equal to S^1, such that

$$\frac{S^1}{8.00} = \frac{1.1287}{1.0891} \text{ and}$$

$$S^1 = 8.00\frac{1.1287}{1.0891} = 8.2909.$$

The purchasing power parity relation is often presented as the linear approximation stating that the exchange rate variation is equal to the interest rate differential:

$$\frac{S^1}{S^0} - 1 = \frac{S^1 - S^0}{S^0} \simeq I_F - I_D.$$

This is only a first order approximation of the exact relation (Eq. 1.1). This purchasing power parity relation is of major importance in international portfolio management. If it holds, purchasing power parity (PPP) implies that the real return on an asset is identical for investors from any country. For example, consider an Italian asset with an annual rate of return equal to 20% in lira. Assume that the inflation rate is 10% in Italy, 2% in the USA and that PPP is verified so that the lira depreciated against the U.S. dollar by about 8%. With the linear approximation, the dollar rate of return on this Italian asset is roughly 12% (20% − 8% of lira depreciation). The real rate of return is approximately 10% for an Italian investor (20% − 10% of Italian inflation) as well as for an American investor (12% − 2% of U.S. inflation). Since investors should care about real returns, they all agree, whatever their nationality, on the return and risk of a specific asset. Exchange rate movements have no influence since they only mirror inflation differentials and equalize real returns across countries.

International Fisher relation

A traditional domestic approach is to define a nominal interest rate, r, as the sum (or, rather, compounding) of the real interest rate, p, and expected inflation over the life of a bill, $E(I)$:

$$(1 + r) = (1 + p)(1 + E(I)). \tag{1.2}$$

The nominal interest rate is observed in the marketplace and is usually referred to as the interest rate, while the real interest rate is calculated from the observed interest rate and the forecasted inflation.

For example, let's suppose a nominal U.S. interest rate of 10% and an expected inflation rate of 8.91%. The real interest rate is then equal to 1% since:

$$1 + 0.10 = (1 + 0.01)(1 + 0.0891).$$

This relation is often presented using the linear approximation[3] stating that the interest rate is equal to a real interest rate plus expected inflation:

$$r \simeq p + E(I).$$

The economic theory proposed by Fisher (1930) is that fluctuations in interest rates are caused by revisions in inflationary expectations, since real interest rates are very stable over time.

Keynesians[4] provide a different explanation for fluctuations in nominal short-term interest rates. They claim that monetary shocks leave short-term inflation unaffected because of sticky goods prices, while real rates react immediately to liquidity conditions. For example, a sudden contraction in the money supply growth rate leads to an immediate increase of nominal interest rates: the real interest rate goes up because money becomes rare and expensive while short-term inflationary expectations are unchanged. Those expectations adjust only gradually to the slowdown in money supply growth.

The international counterpart of Eq. (1.2) is that the interest rate differential between two countries is linked to the difference in real interest rates and expected inflation:

$$\frac{1 + r_F}{1 + r_D} = \frac{1 + p_F}{1 + p_D} \times \frac{1 + E(I_F)}{1 + E(I_D)} \tag{1.3}$$

or the first-order linear approximation:

$$r_F - r_D \simeq p_F - p_D + E(I_F) - E(I_D).$$

The interest rate differential is the linear approximation of

$$\frac{r_F - r_D}{1 + r_D}.$$

The approximation will be poor for high levels of interest rates.

If real rates are equal in two countries, differences in nominal interest rates are caused by different inflationary expectations. This relation is often referred to as the international Fisher relation.

Note that our French/American illustration verifies the international Fisher relation if we expect a continuation of inflation at the same levels. The real rates are identical in the two countries and equal to 1%.

$$1 + r = (1 + p)(1 + E(I))$$

In France

$$1 + 0.14 = (1 + 0.01)(1 + 0.1287)$$

and in the United States

$$1 + 0.10 = (1 + 0.01)(1 + 0.0891)$$

and

$$\frac{1 + r_{FF}}{1 + r_{\$}} = \frac{1 + 0.14}{1 + 0.10} = \frac{1 + E(I_F)}{1 + E(I_{\$})} = \frac{1 + 0.1287}{1 + 0.0891}.$$

This international Fisher relation has important implications for portfolio management. If real interest rates are stable and equal across countries as claimed by the relation, interest rate differentials across countries are basically caused by different expectations of national inflation rates. Differences in real interest rates would motivate capital flows between countries to take advantage of these differentials. The first two parity relations imply an equalization of real interest rates across countries.

Foreign exchange expectations

The foreign exchange expectation relation states that the forward exchange rate quoted at time zero for delivery at time one is equal to the expected value of the spot exchange rate at time one.

$$F = E(S^1) \tag{1.4}$$

This relation would certainly hold if the future values of exchange rates were known with certainty. If one were sure at time zero that the exchange rate would be worth S^1 at time one, then the current forward rate for delivery at time one would have to be S^1, otherwise a riskless arbitrage opportunity would exist.

Let's assume, for example, that we know for sure that the spot exchange rate will be 8.2909 FF/$ in a year, while the one-year forward rate is only 8 FF/$. One could then do the following arbitrage:

- Buy dollars forward at eight francs per dollar and hold the contract until maturity.
- At maturity simultaneously deliver the forward contract and take an offsetting position in the spot exchange rate market.

On the forward contract the arbitrager pays eight francs per dollar, but receives 8.2909 francs on the spot market leading to a profit of 0.2909 francs per dollar. If the expected spot exchange rate is certain, this is a riskless arbitrage that requires no invested capital on the forward commitment. Banks would keep doing this arbitrage until the buying pressure pushes the forward exchange rate to 8.2909 FF/$.