Chapter Overview

This chapter has two major parts: the introduction to the principles of market efficiency and a review of the empirical evidence on efficiency as they apply to the foreign exchange market.

The importance of the concept of market efficiency is discussed at the beginning of the chapter. The concept plays an important role in the study of financial markets. As a theoretical matter, prices in a market economy are assumed to efficiently aggregate available information. As a practical matter, market efficiency is an important benchmark that has a strong bearing on policies in the private sector pertaining to risk management and forecasting and policies in the public sector pertaining to central bank intervention.

The theory of market efficiency is discussed in the first major part of the chapter. The characteristics of an efficient market including the equilibrium benchmark and available information set are defined. The text highlights the distinction between the efficient market hypothesis and the random-walk model of asset prices, which is sometimes incorrectly identified as requirement for market efficiency. It also illustrates that all tests of market efficiency are tests of a joint hypothesis -- (1) the hypothesis that defines market equilibrium prices or market equilibrium returns as some function of the available information set, and (2) the hypothesis that market participants have actually set prices or returns to conform to their expected values. Market efficiency requires that expectational errors follow a fair-game process. When markets are efficient, no excess profit opportunities are consistently available to market participants.

The second major part of the chapter reviews empirical evidence on market efficiency in the foreign exchange market. Rather than test directly whether prices or returns in foreign exchange market conform to their equilibrium-expected values, empirical studies have preferred to test for the availability of unusual or risk-adjusted profit opportunities. In the case of certainty or risk-free investment such as covered interest arbitrage, the empirical evidence is clear-cut and supportive of market efficiency. Once transaction costs and other factors are taken into account, most risk-free arbitrage opportunities in foreign exchange are quickly eliminated. However, in the case of uncertainty and risky investment such as spot speculation and forward speculation, empirical tests of market efficiency are difficult to interpret. Many studies have reported techniques for profitable trading or superior forecasting in both spot and forward markets.
One implication of these empirical results is the possibility of earning speculative profits by using technical trading models. A second implication is the possibility to “out forecast” the forward rate by building a composite forecast that combines additional information with the forward rate. The broader implications of the empirical evidence on market efficiency for private enterprises and public policy makers are examined in the final two sections of this chapter.

**Answers to end-of-chapter questions**

1. Describe three forms of market efficiency. Give an example of each one in the context of the foreign exchange market.

   The original classification divided market efficiency tests into **weak form**, **semi-strong form** and **strong form** tests. Weak form tests rely solely on an historical price series. Tests of technical trading models for profitability are one example. Semi-strong form tests are based on public information. Tests of purchasing power parity as a trading strategy are an example. Strong form tests examine whether inside or private information can be used for earning unusual trading profits. A proprietary forecasting model or advance notice of money supply announcements are examples of inside information that might be used to generate unusual trading profits.

2. Describe the joint hypothesis that underlies all tests for market efficiency.

   A joint hypothesis implies two hypotheses tested at the same time. In the case of market efficiency, we are testing (1) a particular model of equilibrium asset pricing or returns, and (2) the ability of market participants to set prices in conformity with that equilibrium model.

3. Define filter rules and moving average cross-over rules for trading in the foreign exchange market. Under what circumstances would these methods be profitable for a currency trader?

   A filter rule is a method of identifying buy and sell signals for trading in foreign exchange. An \( x\% \) filter rule produces a buy signal when the currency is up \( x\% \) from its last trough; and it produces a sell signal when the currency is down \( x\% \) from its last peak. A moving average cross-over rule is another method for identifying buy and sell signals based on a comparison of short-term and long-term moving averages of recent spot exchange rates. When the short-term moving average first exceeds (falls below) the long-term moving average, the model produces a buy (sell) signal. When markets are efficient these techniques should not produce unusual profits. If exchange rates follow persistent trends *that are not reflected in the interest differential*, then technical trading rules may produce profitable results.
4. How would you determine whether the profits earned by a currency trader were "excessive" and indicative of market inefficiency?

"Excessive" profits are profits in excess of the equilibrium return commensurate with the riskiness of the investment. There is no general consensus on an equilibrium standard for foreign exchange risk. Most benchmarks are, therefore, ad hoc. For example, the Sharpe ratio for the equity market could be used as an ad hoc benchmark.

5. How does a currency risk premium affect the notion of efficiency in the foreign exchange market?

When a currency risk premium exist, the equilibrium return on currency trading is higher. Profits in currency trading do not indicate a market inefficiency if these returns are less than the appropriate risk premium.

6. "If the foreign exchange market is efficient, a corporation does not need to hedge at all." True or false? Explain.

False. A corporation that hedges will reduce its financial exposure to currency risk. If there is no risk premium, the firm does not sacrifice any return while it reduces risk. This reduction in volatility may benefit the firm, especially if it faces high costs of financial distress. (See Chapter 16) If there is a currency risk premium, the firm sacrifices some expected return when it hedges. So it must gauge whether the trade-off in lost expected return is worth the benefit of reduced costs of financial distress.

7. "When the market is inefficient, a corporation should actively manage its currency positions to capture extra-ordinary returns." True or false? Explain.

True. When the market is not efficient, profit opportunities from active currency trading are available.
8. How could government intervention in the currency market impact foreign exchange market efficiency?

Certain types of government intervention could reduce the efficiency of the foreign exchange market. For example, intervention characterized as "leaning against the wind" could slow the adjustment of exchange rates from one level to the next. This could create an opportunity for technical trading profits. Intervention that is successful in reducing exchange rate volatility, such as in a successful target zone, could reduce the opportunities for technical trading profits.

9. What is the "peso problem?" How does the presence of a "peso problem" affect our ability to test for efficiency in the foreign exchange market?

A "peso problem" describes a situation in the foreign exchange market where there is a large probability of little or no change in the rate, and a small probability of a large change in the rate. The peso problem makes it difficult to test for efficiency since, by definition, low probability events happen very infrequently. An efficient market must factor in the likelihood of low probability events, even if they seldom occur.