International Corporate Finance

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Globalization provides access to foreign markets where goods and services can be sold in order to improve profitability and diversify the risk associated with operations. It is therefore important to understand the sense of globalization.

The worldwide implementation of standardized policies and the attempt to achieve harmonized legislations led many companies to try the way of internationalization and to expand their business worldwide.

Many companies take the form of multinational corporations, and they expand their operations in many different countries. International trade follows specific rules and habits that are interesting to explore.

The understanding of international financial markets and international corporate finance goes through the basic knowledge of relevant variables and calculations aimed to clarify the impact of internationalization to the real economy.

Foreign exchange risk management and currency management are crucial tasks for companies aiming to enter the global markets and willing to optimize profits when cash flows denominated in several currencies are involved.

After studying this chapter, you will be able to answer the following questions, among others:

- What are multinational corporations, and how do they integrate in international markets?
- How can international trade be defined and explained in light of the globalization of economic and financial markets?
- What are the major variables of interest in the domain of internationalization?
- What are the main features of foreign exchange markets? How can foreign exchange risk be controlled?
- What is international capital budgeting, and how does it differ from domestic capital budgeting?

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The first section of the chapter is dedicated to the internalization of the firm, with insights on the nature of foreign business. The second section focuses on the basic financial variables of interest when dealing with international markets. The final section aims at introducing foreign exchange markets, with a look at the exchange rate risk and international capital budgeting.

13.1 Internationalization

Learning Outcomes

- Understand international trade.
- Define multinational corporations.
- Learn about globalization and the cost of capital.

13.1.1 International Trade

Most of FX trading takes place in US dollars, which is used to quote the price of many other major currencies. For this reason, such a price is called direct or American quote.

Close to that quotation, on another column, the so-called European exchange rate is recorded, defined as the amount of foreign currency per US dollar, therefore being the reciprocal of the American quote.

International corporations have those firms having consistent and significant foreign operations. Also called multinationals, such corporations must consider many financial factors that do not directly affect purely domestic firms.

The factors to be considered are mostly financial and include things such differentials in interest rates, methodology for foreign operations accounting, taxation overseas, and intervention of foreign regulators.

International corporate finance is governed by the same principles as domestic corporate finance. The companies seek to invest in projects with the aim to create value for the shareholders, at the lowest possible cost.

Therefore, the net present value principle holds for both foreign and domestic operations, although it is usually more complicated to apply the NPV rule to foreign investments (Ang and Tsong-Yue 1989).

The main complication of extending basic NPV method to multinational companies is the presence of international foreign exchange markets. These markets enlarge in fact the range of possible capital sources for the corporation, making capital budgeting and financial decisions more elaborated.

From a risk-return perspective, international markets open the possibilities of diversification for the company that can take advantage of them to hold portfolios that have a higher expected return for the same variance or have a lower variance for the same expected return.

In an integrated market, the investors hold diversified portfolio of risky assets. All investors are assumed to be the same, they invest their wealth in the same way, and the country they come from is irrelevant.

The bottom line is that all investors hold the same portfolio of risky assets, so that they hold the world market portfolio. This result resembles the sense of the CAPM for domestic economies.

As a result, the CAPM holds for all integrated markets together rather than on a country-by-country basis since investors hold securities from all these countries.

The new enlarged market must be considered as the global equity market, where the beta coefficient of any security is computed relative to the market portfolio for the global equity market, which we call the world market portfolio.

The consequences of economic and monetary integration of markets, like in Europe for example, can be direct or indirect. Direct effects are those immediately observable as a consequence of the integration, like the reduction of real risk-free rates, for example.

The convergence of inflation and interest rates, crucial for the good implementation of the integration process, has in fact effects on the real rates, implying that the opportunity cost of investing in equity decreased, reducing the cost of equity capital.

The European central banks tied their monetary policies to the German Bundesbank, therefore becoming inflation averse and managing to stabilize nominal interest rates and inflation at low levels.

This effect on the cost of capital in European countries, other than Germany, can be approximated by the difference in real short-term interest rates from the German rates prior to the period when a monetary union started appearing plausible.

The immediate consequence of decreasing barriers to trade and implementation of a common currency was the increase of risk sharing among European investors, with subsequent reduction of the risk premium and decrease in the average cost of capital.

The launch of a common currency in Europe did not come as a surprise. Therefore stock prices started reflecting the new scenario already before the implementation of the euro. After all, European stock market integration was a gradual process rather than a one-off event.

Required returns and cost of capital started being hit by the expectations on the elimination of barriers, since 1999, with the effect being as strong as the probability of euro occurring being higher.

Estimates of the total rebalancing of equity portfolios from domestic to pan-European portfolios are in the region of $1.5 trillion (more than one-third of market capitalization) (Euromoney, August 1998).

13.1.2 Multinational Corporations

The reason for the internationalization of the biggest corporation is to be found in several factors, like the uneven geographical distribution of factor endowments and market failure.

Industrialized economies have experienced the development of big corporate giants, owning an amount of assets far larger than other countries. When the size of the company is such that it is not possible to fully employ the assets in just the domestic market, these firms can only successfully exploit these assets by transferring them across national boundaries within their own organizations rather than by selling their right of use to foreign-based enterprises.

Another wave of size enlargement has focused on the acquisition of foreign assets as a form of supplement to the nationally endowed assets, thereby making the national origins of the corporations less significant.

Manufacturing firms get the most advantages by becoming multinational, compared, for example, to the services industry. The value chain of manufacturing can be in fact divided across locations.

By locating several stages of the production process in areas of the world that guarantee a low cost for production, the overall costs for the corporation decrease. The same works for locating research and development in countries with high specialization in the field of research.

On the other hand, most of the value chain for service companies must be generated domestically, and there is little in the way of opportunity to centralize activities to low-cost locations. Moreover, services have to be usually tailored on the needs of each customer, making delocalization strongly unlikely to be advantageous.

There is also an issue of knowledge spreading and sharing among the corporate branches all over the world. While it is easy for a manufacturing company to make knowledge available through patented technologies, in the case of service firms, the transfer must be done through a learning process.

Nevertheless, with the liberalization of recent years, the share of services in foreign direct investments (FDI) has risen significantly particularly within telecommunications, utilities, investment banking, business consulting, accountancy, and legal services.

The advantages of multinationals over domestic companies are evident. First of all, there is a size factor that gives the opportunity to achieve vast economies of scale in manufacturing and product development (Blair 2000).

The higher exposition to several cultures and environments also gives the opportunity of innovative ideas and investment chances, regardless of where they occur. Their worldwide presence also gives to multinationals a bargaining power toward governments that tend to preserve investment and jobs.

But there are also downturns in getting global, and not all the multinationals have historically been successful. The Templeton Global Performance Index (Gestrin 2000) reveals that in 1998 the foreign activities of the biggest multinationals in the world accounted on average for 36% of their assets and 39% of revenues, and they only generated 27% of their profits.

Based on the report, it can be concluded that multinationals can be unsuccessful if foreign activities are not managed properly, in terms of acquisitions and development of competencies.

The decision of becoming an international player must be followed by the choice of how to appropriately organize the foreign activities. There are several types of strategy available for that, which are not mutually exclusive.

Different contexts may require different strategies or a mixture of them. The strategies available to the firm can be divided in non-equity modes and equity modes, depending on whether new equity is generated for the expansion or not.

Non-equity mode includes exporting, licensing, and franchising, all cases where the company can access new markets without making extra equity investments. Also contract manufacturing and provision of services abroad are included.

Equity modes involve the employment of new equity in order to realize the expansion project and include joint ventures with foreign companies and fully owned subsidiaries.

All of the above strategies involve different types of risk. Another difference is the organizational management and resource demand, as well as the amount of control that can be exercised over foreign operations. It is helpful to have a closer look at all of them, in order to understand their role in the internationalization of firms.

Exporting carries relatively low risk, as an entry strategy. The ease of exit in fact is quite friendly, and the up-front investment needed is relatively limited. As such, it is an obvious alternative for firms lacking in capital resources.

The main difficulty in being an exporter is to identify efficient and reliable distribution channels. It is difficult in fact to close a contract with a distributor, when signed, so that if dissatisfied not much can be done. Other critical factors are import tariffs and quotas as well as freight costs.

Also licensing involves a low risk level and a limited investment need. Such an entry strategy is particularly useful in economies regulated so to limit the market entry or having high tariffs and quotas, making it almost impossible to export in that country.

Such a strategy is also appealing when the culture of the target country is very different from the domestic environment of the company. A licensing agreement gives a firm in a host country the right to produce and sell a product for a specified period in return for a fee.

Licensing entails a lack of control over the licensee, making it difficult for the licensing company to keep control of quality standard, with potential danger of a negative impact on the brand in case of mismanagement.

There are also issues involved in monitoring the sales on which the royalties are calculated. There is also the risk that the licensee may steal the technology or competence underlying the product, to become a competitor eventually.

Licensing is therefore indicated for those products or services that are at a mature stage and embed an old technology. In other phases of a product's life cycle, direct ownership is a more viable strategy.

As an entry strategy, franchising is far more comprehensive than licensing. The franchiser gives to the franchisee a complete package, which include trademark, products, and services.

The franchisee pays a fee and royalty payments and also receives a complete set of operating principles, so that in the eyes of the customer, the standardization creates the impression of a worldwide firm (Chari and Henry 2001).

The contract manufacturing and service provision strategy is about distinguishing between functions like design, product development, and marketing, on the one hand, and product manufacturing, on the other.

Several big multinational companies, belonging to industries like textile, electronics, and more, contract out their manufacturing processes to countries like China, Indonesia, Thailand, and Vietnam, primarily for reasons of cost.

The main benefit of outsourcing production in these areas of the world is the absence of the problems of local ownership. Moreover, the company does not invest its own capital in manufacturing.

There are issues related to the externalization of production in low-cost areas of the world. First of all, over the years, some of the multinationals have become a focus for international scrutiny because of allegations of misconducts toward employees.

Moreover, it has been widely recognized that there must be some moral responsibility for the working conditions at contractor manufacturers, which usually turn out to be at the boundary of slavery, with a lot of working hours and very low salaries.

Following allegations to the major groups in the world, specialized bodies have examined the working conditions in the contractors, in order to improve the quality of the work environment.

Major mobile phone vendors, for example, have applied the same model to handset manufacturing. They outsource the production of handsets to Asian companies on a contractual basis while retaining control of research, design, branding, and marketing.

By not owning the production factories, vendors have the advantage to be more flexible. They can accelerate or slow down the production according to fluctuations in consumers' demand for their products, avoiding long-term capital expenses.

However, the lack of direct control in a crucial stage of the supply chain represents a big disadvantage. It is in fact more complicated to implement efficient quality control, and there is also a dependency on the contract equipment manufacturer (CEM) possessing or having access to the necessary parts.

Besides manufacturing, distribution can also be outsourced. This makes the multinational very different from the traditional definition of a firm. It becomes a vertically integrated organization, so much as a network of contractually determined market-based obligations that together constitute a complete supply chain.

There are new managerial challenges embedded in such an organizational form, with the management of contracts across borders being at the center of the analysis. Finally, it should be noted that contract arrangements are by no means confined to manufacturing.

As an example, consider the supply of IT services to the largest multinationals in the world. This is normally contractually accomplished by Indian service providers, because of their combination of low costs and advanced processing skills. The range

or provided services go from simple system maintenance to more specialized development of applications and web services.

International joint ventures (IJVs) are contractual agreements between two companies, to realize a product or service together. As a strategy, it involves a higher investment compared to other strategies.

In an IJV strategy, a multinational contacts a local partner and shares proportions of equity with it in the investment. Equity proportions vary but usually relative ownership approximates to half-half. Many other combinations are anyway possible and are based on negotiations and individual contributions of the partners.

An IJV is usually set up with a managerial team of up to 10 managers. The negotiation about the control of the positions is another central issue. Particularly important is the position of general manager, usually assigned to the partner with dominant equity position. The partner that does not win the top position will argue strongly for other slots that guarantee the desired level of representation.

The members of the managerial board of the IJV are expected to commit themselves to the success of the venture. Moreover, they are delegates of the respective sponsor companies.

The IJV is structured like a legal entity with a board of directors deciding about priorities and the use of profits. Moreover, the board decides about investment policy and other critical things.

In some countries like India or China, the only way to enter the market was to have the participation of a local company in the venture, making IJV the only possible strategy to enter those markets.

However, even when local participation is not obligatory, an IJV may be appropriate because a local partner can provide intermediate inputs, such as local market knowledge, access to distribution networks and natural resources, as well as making the MNC an insider in the host country.

The IJVs provide a quick entry into markets otherwise very difficult to exploit. Another advantage is that risk is shared among partners and the economies of scale increase thanks to the increase of size.

In terms of power, it is common that the multinational overtakes the local partner, both in terms of technology and management skills. As a result, the local partner may end up being disturbed by the tendency of the multinational to protect its technology.

Another point of controversy is the imposition of control on the venture by the multinational on one side and the lack of trust of the latter in the local partner, due to the controversies.

Such a set of frictions is at the basis of the reason why in many cases IJVs are characterized by general dissatisfaction of both partners or even failure due to that. This behavior has been observed in something like half of the analyzed IJVs involving a multinational (Fey and Beamish 2000).

13.1.3 Globalization and the Cost of Capital

At the end of the Second World War, many of the currencies in the world were not convertible anymore, and the only way to invest in foreign market was to somehow get access to the scarce foreign currencies.

On top of that some countries had put in place restriction on foreign investments, making the problem of conversion even irrelevant. In some cases, foreign investors could not buy local shares. In other cases, domestic investors were not allowed to hold foreign shares.

The demand of foreign investors for shares in domestic companies was still in place, but very often they did not carry any voting rights, with limits on foreign ownership imposed by the local governments (Barro et al. 1991).

Most countries had created barriers to foreign ownership of local firms, introducing severe limits on foreign ownership. In addition to restrictions resulting from laws and regulations, there were obstacles related to other factors like political risk, accounting rule heterogeneity, and inadequate preparation of institutions to play internationally.

Barriers have progressively crumbled, with most developed economies reaching a high level of integration and emerging economies overcoming the previous barriers toward other countries.

Modern companies have the chance to raise capital from several international markets, and nowadays both offshore and onshore sources of funding are available. This also generated an obvious link in the expectations of investors among different continents, who are nowadays aware and worried about what is happening to some financial market on the other side of the world.

Markets, like New York, Tokyo, Hong Kong, and Shanghai, are all lined up, and they all benefit or suffer from the shocks happening in the others. Investors worldwide want to be constantly updated with the info coming from all over the world.

People in the financial academic sector have initially welcomed the globalization phenomenon, underlying the benefits to investors and companies. On the other hand, regulators and policymakers have questioned about how far the process could get before generating more troubles than advantages.

Someone argued that after the events in the last years and the crisis that spread worldwide due to the high level of interconnection of the economies, barriers should be reintroduced, at least to mitigate capital flows.

Recall that the cost of capital of a firm depends on its debt among other things and the taxation effect that the debt carries. The best way to grasp the effect of globalization on the cost of capital is then to focus on the cost of equity.

Taxation in fact varies from country to country, making the debt a very peculiar source of capital among different countries. Cost of equity instead is more standardized, with homogeneous features around the world.

The information asymmetry problem is the strongest argument for departure from the Modigliani-Miller theorem. Managers in fact tend to be more informed than investors about the company's cash flows. Besides the information asymmetry

problem, managers have their own objectives that may differ from those of investors. This is the agency costs problem.

The aim of the management is the growth of the firm, and this makes the interest of managers conflict with those of the investors sometimes. Investors know that managers want to raise capital at any cost, so they will not trust their cash flow predictions.

This creates a cycle in which the managers are forced to not be able to raise enough capital for the projects they would implement. For existing firms, management may have to give up too much of the value of the firm to raise the capital it wants.

Therefore, one can envision a relationship between the cost of capital and capital structure of a firm and its governance. Information and agency costs problems impact firm value, and poorly governed firms experience the worst consequences from the two issues.

When a company goes international, the globalization process has an impact on its governance, among other things. The new shareholders, for instance, may have skills and information that enable them to monitor management in ways local investors could not.

Another effect of globalization is the access to capitals, which becomes more competitive. In closed economies in fact, the number of providers of funds is sometimes limited, therefore lacking competition among lenders.

In an international environment instead, capital can be raised in a more competitive environment, especially in case of large amounts of capital needed. The increased number of fund providers makes it easier to find the right lender and reduces the transaction costs associated with capital raising (Black 1974).

There is also a huge impact of globalization in the quality and the structure of corporate control. Sometimes companies with very large market share in their domestic market become one of many competitors in a foreign market. Also, takeovers may not be a problem domestically, but after internationalization the company may be more exposed.

The monitoring of managers is consequently increased, and both existing shareholders and potential acquirers are interested in the topic.

Another consequence of internationalization is connected to the issue of capitalization. Companies that are active on financial markets can benefit from extending their activities abroad. Funds raised internationally have the advantage of a higher diversification, with a corresponding decrease in the risk.

Some aspects of globalization relate to the fact that not all money markets are integrated. If this is the case, by traditional macroeconomic theory, the interest rate in a country has to be such that savings and investment are balanced.

The excess of one respect to the other in a closed economy would make the interest rate move quite suddenly, for any unexpected increase of one of them. In particular, the interest rate would raise for an excess of investments over savings and vice versa. The interest rate would react to place the economy back in equilibrium.

In a globalized economy, the internal balance between investments and savings does not have to be necessarily reached, and capital inflows and outflows can

stabilize the equilibrium so that in general the interest rate is much less volatile than in a closed economy.

It is very hard to quantify the volatility reduction effect on interest rate due to globalization, even if some researchers have tried to measure it. However, for the purpose of this section, the rough idea of a lower volatility due to internationalization is enough.

The same reasoning for the interest rate can be applied to the risk premium demanded by the investors. In a country with barriers to internationalization, the risk of economic activities is normally shared among domestic investors only.

It follows that the demanded risk premium is strictly linked to the riskiness of the country's economic activities. The average risk aversion of domestic investor will therefore be a measure of the risk premium (Booth 1982).

When a country decides to open up its capital market to foreign investors, also allowing its domestic investors to invest abroad, the risks associated with the economic activities of the country are not born entirely by domestic investors anymore.

The risk is now shared with foreign investors, proportionally to the amount invested by them in the economic activity. For domestic investors, the benefit from bearing both domestic and foreign risks rather than only domestic risks is that some of these risks offset each other through the process of diversification.

The information that hits a globalized market is controversial. Some countries may experience a flow of bad news at a specific point in time, while other countries may have good news at the same time.

As a consequence, investors will be diversifying their portfolio by investing their wealth in different markets. They will be subject to shocks on several markets that most probably will offset each other, giving a diversification effect due to internationalization of the investment.

An example of how the effect is developed is assuming that the global economy is populated by a large number of small countries. Moreover, one can assume that for every country, the return and risk are the same and that markets are uncorrelated with each other.

When countries open up to the global market, they become interdependent. Following standard portfolio theory, investors are risk maximizers and risk minimizers. As a consequence, each investor will hold the world market portfolio, the one that ensures the maximum diversification benefit.

The expected return of the invested wealth of an investor does not depend on how his wealth is invested across countries, but the variance of the return of the investor's invested wealth falls with the number of countries in which he invests.

According to the assumptions above, for a very large number of uncorrelated economies, the overall risk for a fully diversified portfolio will tend to zero, therefore yielding no risk premium (Holland 1990).

In the context of risk minimization and profit maximization, the international investors hold an internationally diversified portfolio of risky securities, by measuring how they contribute to the variance of the return of the diversified portfolio.

The result is that the CAPM holds for integrated markets. This approach looks at an international market as a single aggregate market which we call the global equity market.

It is then possible to indicate a world market portfolio and to calculate the beta coefficient of a risky security relative to the market portfolio for the global equity market.

It is possible to formalize mathematically a more general case, considering a small country with equity market separated by the equity markets abroad.

Since the country is small, adding that country to the world equity markets does not increase the risk premium on the world market portfolio. To eliminate the impact of differences in risk aversion, the assumption is that all investors in the world have the same constant relative risk aversion.

It is possible to indicate the risk in the country before opening up to the world by a constant λ. Consequently, the risk premium on the small country before integration is given by

$$\lambda = \sigma_{\text{sc}}^2 T$$

where:

σ_{sc}^2 is the small country's market portfolio return variance.

In order to consider the risk premium after internationalization λ^*, recall that the equity market of the small country becomes integrated in the global equity market. By denoting with $E(r_{\text{w}})$ the expected return of the global market portfolio and with r_{f} the risk-free rate, the excess return on the world market portfolio is given by

$$E(r_{\text{w}}) - r_{\text{f}}$$

The CAPM model holds for the global market, and the expected return and risk premium on the risky asset depends on the expected return on the world market portfolio, as quantified by the beta coefficient. This can be described as

$$\begin{aligned} \lambda^* &= \beta_{\text{sc}}[E(r_{\text{w}}) - r_{\text{f}}] \\ &= \rho\sigma_{\text{sc}}\sigma_{\text{w}} T \end{aligned} \tag{13.1}$$

where:

σ_{sc} is the volatility of the small country portfolio.
σ_{w} is the volatility of the world market portfolio.
ρ is the correlation coefficient between the return of the small country portfolio and the return of the world market portfolio.

The beta of the small country market portfolio with respect to the world market portfolio is defined as

$$\beta_{\text{sc}} = \frac{\rho\sigma_{\text{sc}}\sigma_{\text{w}}}{\sigma_{\text{sc}}^2}$$

By looking at Eq. (13.1), it is clear how the price of risk in the world equity market is the same for all investors. By comparing the risk premium before and after globalization, it follows that a necessary and sufficient condition for globalization to reduce the risk premium of the small country is that

$$\rho < \frac{\sigma_{sc}}{\sigma_{w}}$$

The condition holds in case an investor in the small country can form a portfolio with lower variance than the market portfolio of the small country, by moving some of the wealth from the small country market to the world market portfolio. It is possible that this condition would not hold for a specific country.

The effect of globalization on the domestic market of the small country could be an increase of the cost of capital. This happens because the country's risk premium depends on the covariance of its covariance with the return of the world market portfolio (Shapiro 1978).

For a high level of covariance, this means that the market portfolio of the country is risky from the perspective of the global markets. It is therefore expected to earn risk premium that exceeds the risk premium it would be expected to earn if it was segmented from the global markets.

If there is no correlation between the return of the market portfolio of the small country and the return of the world market portfolio, the small country's market portfolio is not expected to earn a risk premium when it is integrated in the global market.

As a consequence, for not too high correlation between the small country's market portfolio return and the return of the world market portfolio, the small country's risk premium falls when it joins the global equity market. The same applies if the volatility of the small country's market portfolio is not too low.

13.2 The Variables Involved

Learning Outcomes

- Define and explain what exchange rate is.
- Understand the purchasing power parity.
- Understand the interest rate parity.

13.2.1 Exchange Rate

The price of the currency of one country, expressed in terms of the currency of another country, is called exchange rate. Exchange rates can be expressed in couples, but nowadays, all currencies are commonly valued against US dollar or euro as common benchmarks.

The ancestry of the exchange rate model was the monetary model, which assumed the current exchange rate to be determined by fundamental macroeconomic variables like the money supply or the GDP. By combining the macroeconomic variables with the expectations of the investors about future exchange rates, the model is supposed to yield the current exchange rate (Booth 1982).

Still nowadays, journalists of popular specialized magazines analyze the movements in the exchange rates using the results of the monetary model. The same holds for the analysts in various parts of the world, who typically resort to some variant of the monetary model.

The rationale behind the monetary model is that the exchange rate is basically determined by the relative level of the prices in the two countries. The ratio between the prices in two countries will determine the ratio of exchange rate between currencies.

Then it is interesting to investigate what are the determinants of the relative price levels in the countries. In the case of the monetary system, the analysis is based on the money supply which is assumed to be positively correlated with the level of prices.

Example 13.1 Assume that the money supply in Europe rises so that the level of prices in the euro area will rise as a consequence. If the price level in the foreign country remains fixed, it will take more euros to buy one unit of foreign currency. The price of a euro in foreign currency will rise, so that the euro will depreciate.

The level of real output in each country matters as well because it affects the price level.

Example 13.2 If the level of output in Japan rises, but other fundamental factors, including money supply, remain constant, there will be a decrease of the average level of prices in Japan. As a consequence, the Japanese yen will appreciate.

Also future macroeconomic data matter, in that they determine market expectations. Therefore, expectations on future exchange rate are directly related to the level of the current exchange rate.

If the market expects the dollar price of the yen to become higher in the future than it is today, the dollar price of the yen will tend to be high today. But if the market expects the dollar price of the yen to be lower in the future than it is today, the dollar price of the yen will tend to be low today.

Example 13.3 It is possible to use the monetary model to predict the euro-dollar exchange rate. The relationship between the fundamentals of the economy and the exchange rate is very important. If the money supply in the United States grows faster than in Europe, the dollar will depreciate. The opposite happens if the money supply grows faster in Europe.

The analyst needs to assess monetary policy in the two countries. Moreover, he must assess expectations about the future exchange rate. If the market's expectation of the future exchange rate were to change, the current exchange rate would move in the same direction.

All the fundamentals act simultaneously in determining the forecast on exchange rate. It is therefore useful for the analyst to use a statistical model allowing to combine the effect of all the variables.

The use of the monetary model in practice is made difficult by the lack of knowledge about the true value of the economic fundamentals, which is often ignored by the analyst.

The main variables of interest are in fact never known for sure, but they are normally forecasted given the current available economic data. In this sense, expectations about the future of the exchange rate are unobservable, therefore even harder to assess.

Assuming the monetary model is valid, the forecast about exchange rate is successful, and then the predictions about fundamental values are good. After early success, the model was proven to fail empirically, except in very extreme conditions.

After the failure of the monetary model, economists went to work developing other ideas. Rudiger Dornbusch developed a variant of the monetary model called the overshooting model.

The model assumes that the average level of prices is fixed in the short term, matching the assumption that prices in the real world change very seldom. The assumption has the effect to overshoot its long-run value as a result of a change in the fundamentals and then turning back to the long-run value.

Also the modified model was soon shown to fail empirically. In particular, the model lacks a strong statistical relationship between the fundamentals and the exchange rate. That relationship should in fact exist if the model were true.

The portfolio balance model is another extension of the monetary model, in which the determinants of the exchange rate are the supply and demand of foreign and domestic bonds together with the demand for foreign and domestic money.

The model itself has proven to fail, but further versions have been developed, taking into account an optimal solution for the choice of bonds and money in the portfolio. According to such a theory, the substitution rate of domestic for foreign bonds depends on the risk aversion of the investor and on the volatility of the returns on the bonds. Moreover, the correlation between the returns on the different bonds in the portfolio is also important.

It turns out from the empirical application that the three major models of the exchange rate, namely, the monetary, the overshooting, and the portfolio balance models, do not provide a satisfactory account of the exchange rate.

The news about the fundamentals are important drivers of the exchange rate, and market participants form expectations about the value of the money supply before the government announces the money supply figures.

These expectations drive the investment decisions of traders to whether buy or sell currency. Once the investment decisions are made, the interaction of those on the market determines the current level of the exchange rate.

Market participants trade currencies following the announcements about relevant macroeconomic measures, like the change in money supply. Thus, news about fundamentals, under this view, is an important determinant of the exchange rate.

13.2.2 Purchasing Power Parity

Several theories deepen the analysis among the financial variables involved in the interaction of worldwide economies. These rules are basic for the understanding of the dynamics of international finance and trade.

The purchasing power parity (PPP) stands as a popular theory for determining the exchange rate, allowing comparison between the relative average costs of goods and services between countries.

According to the PPP theory, the dynamics of the exchange rate are determined by the deals of importer and exporter, who act based on the price differences across different countries.

Basically there is a link between the current account of some country and the value of the exchange rate on the foreign exchange market. This contrasts with the interest rate parity theory which assumes that the actions of investors, whose transactions are recorded on the capital account, induce changes in the exchange rate.

The theory links to the law of one price, which is the foundation for PPP, by applying it to the global economy. For those who are not familiar with the law of one price, it is useful to briefly recall it (Errunza and Losq 1985).

The law of one price (LOP) states that in the absence of transportation costs and tax differential between two markets, the price of identical goods must be the same in both markets, in order to avoid arbitrage opportunities and profits on price differences.

İn case of a price difference, in fact, it is possible to make a profit through trade by buying goods on the cheapest market and selling them on the more expensive, if no other costs are incurred in the trade.

The idea between the law of one price is that identical goods selling in an integrated market, where there are no transportation costs or differential taxes or subsidies, should sell at identical prices.

The PPP theory implements the LOP by generalizing its statement to all goods in a market. The best way to show it is, mathematically, through the definition of several variables.

First of all let's define the variable $B_{€}$ to be the cost of a basket of goods in the euro area denominated in euros. A very efficient way to generate the basket is by making it a proxy of the consumption basket in the economy.

The basket is then determined by surveying the quantity of different items purchased by many different households. In fact, it can be determined, on average, how many units of different goods are purchased by the typical household.

Similarly, it is possible to define the variable $B_£$ as the cost of a market basket of goods in the United Kingdom denominated in pounds. Now if the law of one price holds for each individual item in the market basket, then it should hold for the market baskets as well. This can be mathematically written as

$$\frac{B_€}{e_{€/£}} = B_£ \tag{13.2}$$

where:

$e_{€/£}$ is the exchange rate.

There are two forms of PPP, namely, the absolute and the relative form of the theory. İn order to understand their meaning, it is useful to consider them one by one. The absolute PPP is obtained by reworking the right-hand side of (13.2) so to obtain

$$e_{€/£}^{PPP} = \frac{B_€}{B_£}$$

The PPP is satisfied when the above relationship holds, with the consequence that the related exchange rate is equal to the ratio between the relative cost in domestic currency of the same basket of products in the two different economies.

As a logical consequence, the reciprocal relationship

$$e_{£/€}^{PPP} = \frac{B_£}{B_€}$$

holds as well.

Because the cost of a market basket of goods is used in the construction of the country's consumer price index, PPP is often written as a relationship between the exchange rate and the country's price indices.

The relative PPP says that variations in the exchange rate between two economies is determined by the difference in the respective inflation rates. Put in formulas, the relative PPP says that the expected percentage changes in the exchange rate over the next year, defined as

$$\frac{E(e_1) - e_0}{e_0}$$

is given by

$$\frac{E(e_1) - e_0}{e_0} = i_{FC} - i_{DC} \tag{13.3}$$

where:

e_0 is the current exchange rate between domestic and foreign currency.
$E(e_1)$ is the expected exchange rate at time 1.
i_{DC} is the inflation rate in the domestic country.
i_{FC} is the inflation rate in the foreign country.

It is now possible to rearrange the terms in (13.3) to obtain that

$$E(e_1) = e_0[1 + (i_{FC} - i_{DC})]$$

In general, relative PPP says that the expected exchange rate at some time t in the future is

$$E(e_t) = e_0[1 + (i_{FC} - i_{DC})]^t$$

The absolute PPP is very strict, therefore not holding for most economies and basket of goods. The relative PPP is instead a good starting point for studying the dynamics of the exchange rates between countries.

As a matter of clarification, from now on the acronym PPP is used to mean relative parity, and the absolute parity is dropped.

13.2.3 Interest Rate Parity

When the market is free of covered arbitrage opportunities, there is a relationship between spot exchange rates, forward exchange rates, and relative interest rates. That relationship makes the market free of arbitrage.

To see what this relationship is, consider the following investment strategies. The first strategy is investing in a riskless domestic investment at a rate r_{DC} which gives a return of $(1 + r_{DC})$ for every dollar we invest.

The second strategy involving investing in a foreign risk-free investment gives

$$E(e_t) = \frac{e_0(1 + r_{FC})}{f_1}$$

where:

r_{FC} is the risk-free rate in the foreign country.
f_1 is the foreign exchange rate between domestic and foreign currency.

In order to avoid arbitrage, the above strategies must yield the same result. Therefore, the relationship

$$1 + r_{DC} = \frac{e_0(1 + r_{FC})}{f_1} \tag{13.4}$$

must hold.

It is then possible to rearrange the terms of Eq. (13.4), to get the interest rate parity (IRP) relationship that can be written as

$$\frac{f_1}{e_0} = \frac{1 + r_{FC}}{1 + r_{DC}}$$

The relationship states the connection between the spot interest rates in both economies and the forward rates as well. It illustrates very clearly what is going on and is not difficult to remember.

A slight mathematical work on (13.4) allows to represent the IRP in the form of a percentage forward rate premium (or discount), which is equal to the difference between the interest rates in the two economies, as defined by

$$\frac{f_1 - e_0}{e_0} = r_{FC} - r_{DC}$$

The interpretation of IRP is that differences in the interest rates between two economies, in the midterm, are balanced by a corresponding change in the relative value of the currencies, so that the market becomes free of arbitrage.

By reworking the IRP equation, it is possible to show the relationship for t periods instead of just one, in the form

$$f_t = e_0[1 + (r_{FC} - r_{DC})]^t$$

Another popular relationship, which is basic for the understanding of exchange rates, is the so-called unbiased forward rate (UFR) condition.

One should recall that from basic financial theory, the UFR is equal to the expected future spot rate. The relationship can be therefore written as

$$f_1 = E(e_1)$$

and, in t periods,

$$f_t = E(e_t)$$

If risk is not taken into account, the UFR condition generally holds. If the forward rate on some domestic currency is consistently lower than the future spot rate by some fixed amount, anyone who wanted to convert from foreign to domestic currency in the future would consistently get more of the latter by not agreeing to a forward exchange.

In order for investors to be interested in forward exchange, the forward rate should increase. The opposite holds in case the forward rate was consistently higher than the future spot rate.

In that case, anyone who wanted to convert domestic to foreign currency would get more value by not agreeing to a forward trade. The forward exchange rate would have to decrease to attract such investors.

What the future spot rate will actually be is uncertain, of course. The UFR condition may not hold if traders are willing to pay a premium to avoid this uncertainty. If the condition does hold, then the 180-day forward rate that we see

today should be an unbiased predictor of what the exchange rate will actually be in 180 days.

Finally, it is possible to combine the various relationships developed in this section in order to explore the implications of them as a group.

For example, it is possible to combine UFR and IRP. Given that UFR relationship states that $f_1 = E(e_1)$, it is possible to substitute $E(e_1)$ for f_1 in the IRP to get the so-called uncovered interest parity (UIP), as

$$E(e_1) = e_0[1 + (r_{FC} - r_{DC})]$$

The UIP is very important for international capital budgeting purposes. Generalizing for t periods, the UIP becomes

$$E(e_t) = e_0[1 + (r_{FC} - r_{DC})]^t$$

The comparison between PPP and UIP, on the other hand, yields the popular international Fisher effect (IFE). By looking at the respective formulas, the equality of the two relationships leads to

$$e_0[1 + (i_{FC} - i_{DC})] = e_0[1 + (r_{FC} - r_{DC})]$$

meaning that

$$i_{FC} - i_{DC} = r_{FC} - r_{DC}$$

The information given by the relationship is very clear. The difference in the interest rates between two countries is equal to the difference in their inflation rates. Rearranging this slightly gives us the international Fisher effect as

$$r_{DC} - i_{DC} = r_{FC} - i_{FC}$$

It follows that real interest rates are equal across countries. It is a basic relationship in economics, if one recalls that a differential in the real interest rates between two economies would cause money to flow into the high-rate economy.

As a consequence, the price of financial asset into the flows-receiving country would rise, with returns falling. The opposite would happen at the same time in the country with lower real rates. Such a process would finally equalize returns.

It is obvious that the above discussion should be adjusted to risk and barriers occurring in world trading. Both factors imply that returns might be different in two different countries for long periods of time if money can't move freely between them.

Anyway, with the progressive internationalization of markets, any differences in real rates that do exist will probably diminish. The laws of economics have very little respect for national boundaries.

13.3 Foreign Exchange Markets

Learning Outcomes

- Learn about foreign exchange market background.
- Understand foreign exchange risk.
- Explain international capital budgeting.

13.3.1 Background

The money from one country to another is physically exchanged through the foreign exchange market, which is an institutional structure where the rate of exchange between currencies is determined and foreign exchange transactions are physically completed.

A foreign exchange transaction is an agreement between a buyer and a seller that a given amount of one currency is to be delivered at a specified rate for some other currency.

The FX market covers the whole world, and the trading takes place every hour, in different places, every business day. The market reaches most of its liquidity in the early European afternoon, when the markets of both Europe and the US east coast are open.

Foreign exchange trading in some countries is conducted by open bidding on an official trading floor. The official published prices are the closing prices for the day, and some transactions are then based on that closing price.

Through the FX market, a person or firm transfers purchasing power to other countries. Moreover, it functions as a way to obtain or provide credit for international commerce, and investors can also use the FX market to hedge against FX risk.

The transfer of purchasing power in particular is needed due to the involvement of different currencies in international transactions, given that the parties normally reside in different countries. Each party usually wants to deal in its own currency, but the transaction can be invoiced in only one currency.

About the provision of credit, the movement of goods between countries requires financing of the transiting inventories, given the time required for the transfer to take place. The minimization of FX risk finally is provided through hedging by transferring the risk to some other investors by using appropriate securities.

The FX market is composed of two major parts, namely, the wholesale market and the retail market. The wholesale market involves transactions of high volume worth multiples of millions. In contrast, contracts between a bank and its client are usually for specific amounts, sometimes down to the last penny.

The FX dealers, which are mostly banks, operate in both the interbank and the client markets. They profit from buying foreign exchange at a bid price and reselling it at a slightly higher ask price (Sager and Taylor 2006).

The benefit of the globalized competition among dealers is that the bid-ask spread narrows down. This makes the FX market efficient in terms of the requirements that qualify efficiency in all the other markets.

The biggest international banks have large FX departments, and their dealers act as market makers. They specialize in currencies and buy and sell them by maintaining an inventory position in those currencies.

The big importers and exporters are participants in commercial and investment transactions. On top of them, there are international investors, multinationals, and other users of foreign currencies. Some of these participants use the foreign exchange market to hedge foreign exchange risk.

There are also speculators and arbitrageurs in the FX markets. Speculators, like in other markets, aim to make profits from trading in the market, by buying at cheap prices and selling at expensive prices. They operate in their own interest, without a need or obligation to serve clients or to ensure a continuous market. On the other hand, arbitragers try to profit from simultaneous exchange rate differences in different markets.

Other players in the FX market are the central banks and treasuries. The former acquire or spend their foreign exchange reserves, and at the same time, they influence the price at which their own currency is traded.

Compared to other investors, the central banks are better off when making a loss on the FX transactions they perform. They are therefore driven by different motives and behavior.

FX brokers are agents who facilitate trading between dealers, but they do not become principals in the transaction. They charge a fee for the service and provide themselves with hundreds of dealers worldwide.

The broker must have knowledge of what dealers want to buy or sell currency, so that they can find a counterparty for the customer in a very short time, keeping the transaction anonymous until the deal is achieved.

Transactions in the FX market can be executed in three modalities, namely, spot, forward, or swap. A spot transaction involves the immediate delivery of foreign currency from the seller to the buyer.

In the interbank market, a spot transaction involves the purchase of foreign exchange with delivery and payment between banks to take place, normally, on the second following business day. The date of settlement is referred to as the "value date."

Most transactions on the FX markets are spot and take place in real time. Forward transactions require the delivery of a specified amount of currency for a specified exchange rate, at a specified date. The exchange rate to prevail at the value date is established at the time of the agreement, but payment and delivery are not required until maturity.

Forward FX contract are quoted for maturities of 1–12 months, but the actual agreements can last for longer. Outright forward transactions only account for about 9% of all foreign exchange transactions.

Swap transactions are based on the simultaneous purchase and sale of some amount of foreign currency, spread on two different value dates. A spot against forward, for example, involves a dealer buying currency in the spot market and selling it back (for the same amount) in the forward. The agreement is executed as a single transaction, so that there is no FX risk for the dealer. Swap transactions account for about 48% of all foreign exchange transactions.

When looking at quotations on the FX markets, an interbank quotation is how commonly professional investors exchange quotations. It is the basic format used to display the quotes on the trading screens worldwide.

In the United States, the European terms quote shows the number of units of foreign currency needed to purchase one USD:

EUR 0.99/USD

An alternative method is called the American terms. The American terms quote shows the number of units of USD needed to purchase one unit of foreign currency:

Generalizing for the rest of world markets and currency couples, direct quote is a home currency price of a unit of foreign currency.

An indirect quote is a foreign currency price of a unit of home currency. In Europe, a direct quote for the British pound is.

USD 0.6341/CAD

This quote would be an indirect quote in Canada.

Interbank quotations are given as bid and ask rates, with investors buying at the bid price and selling at the ask price. Bid and ask quotations are complicated by the fact that the bid for one currency is the ask for another currency:

The foreign exchange (FX) market is the market where currencies are traded, and it is one of the largest world financial markets. Most of the trading takes place in major currencies like the euro, the dollar, the British pound, and the Japanese yen.

It is an over-the-counter (OTC) market, meaning it is not officially regulated like a regular exchange. The market participants are located in the major commercial and investment banks around the world.

All the major traders use computer connection, telephone, and other sorts of communication networks to communicate trading decisions, and connection is maintained by the Society for Worldwide Interbank Financial Telecommunications (SWIFT), a company with headquarters in Belgium.

The SWIFT processing centers allow banks from all parts of the world to communicate easily and perform trading actions in real time. There are several types of participants in the foreign exchange market including importers, exporters, portfolio managers, FX brokers, traders, and speculators.

Regarding the types of transactions available on FX markets, there are two basic trading methods: spot trades and forward trades. A spot trade is an agreement to exchange currency "on the spot," meaning the transaction will be completed within two business days.

The spot exchange rate, as the name suggests, is traded on the spot, and it is the most typical type of transaction involving currencies.

On the other hand, a forward trade is an agreement to exchange currency at some time in the future. As for any other forward contract, the exchange rate that will be used is agreed upon today and is called the forward exchange.

13.3.2 Foreign Exchange Risk

Currency risk or FX risk is the risk related to a financial transaction which is denominated in a currency other than that of the base currency of the company. Also the foreign subsidiaries of domestic firms are subject to FX risk when they register entries in their financial statements, in a currency that is different from the one of the parent company.

The risk implied in FX investments is that an adverse movement in the spot exchange rate will change the amount of domestic currency required to buy units of the foreign currency, before the transaction date.

All the businesses that trade goods or services internationally or make foreign investments are subject to an exchange risk, which sometimes has severe consequences on the finances of the firm. However, like other types of risk, it is possible to manage it.

Transaction exposure happens when a company has contractual cash flows subject to changes in value due to unanticipated variations in the exchange rates, due to a contract being denominated in a foreign currency.

In order to assess the domestic value of the cash flows denominated in foreign currency, a company must exchange the foreign currency for the domestic currency. When contracts are negotiated with set prices and delivery dates with volatile exchange rates, firms face a risk of changes in the exchange rate between the foreign and domestic currency.

The application of international accounting rules impacts on companies having transactional exposure through a process called remeasurement. As the name suggests, the process involves remeasuring the current value of the contractual cash flows at each balance sheet date.

If the value of the currency of payment or receivable changes in relation to the firm's base or reporting currency from one balance sheet date to the next, the expected value of these cash flows will change.

Another type of exposure the firm is exposed to is the economic exposure or forecast risk, due to the fact that the market value of the company is influenced by unexpected changes of the exchange rates.

The movements in the exchange rate values can affect the market share position of the company and modify it in relation to its competitors. Also the future cash flows and the firm's value are affected as a consequence.

The way economic exposure affects the firm is through the modification of the present value of the future cash flows. Any transaction that exposes the firm to foreign exchange risk also exposes the firm economically.

Economic exposure can be caused by several different business activities and types of investment, which are not barely transactions, like future cash flows coming from fixed assets.

When fluctuations in the foreign exchange market affect the demand for a good or service in some country, the company selling that good or service will be affected as well.

The problem with economic exposures is that they cannot be hedged due to limited available data and it is costly and time-consuming. Economic exposures can be only indirectly managed through product differentiation, pricing, branding, outsourcing, etc.

Translation exposure refers to the extent to which a firm's financial reports are affected by fluctuation in the foreign exchange market. Firms are asked to prepare consolidated financial statements, meaning that the consolidation process for multinationals involves translating the foreign assets and liabilities to domestic currency. The same applies to the financial statements of the foreign subsidiaries of the parent company.

It is possible that translation exposure may not affect the cash flows, but their impact on the reported earnings and the stock price can be relevant anyway. Translation exposure is distinguished from transaction risk as a result of income and losses from various types of risk having different accounting treatments.

A firm has contingent exposure when it gets involved in foreign projects or negotiating other contract or foreign direct investments. The firm could face potential transactional or economic foreign exchange risk by undertaking those ventures.

Sometimes a company has to wait for acceptance of a bid on a project by an external institution. The acceptance of the bid would then result in an immediate profit to be received.

While waiting, the firm faces a contingent exposure from the uncertainty as to whether or not that receivable will happen. If the bid is accepted and a receivable is paid the firm and then faces a transaction exposure, a firm may prefer to manage contingent exposures.

When all the parties in the foreign exchange market works, so that the markets are in equilibrium and efficient, a firm does not need any protection against foreign exchange risk, and it is indifferent toward foreign investment decisions. Deviation from international parities generates an exposure to foreign exchange risk.

The standard deviation of the percentage returns given as rates of change of the spot exchange rate are the normal measure of risk on foreign exchange markets. In foreign exchange, a relevant factor would be the rate of change of the spot exchange rate between currencies.

There are several hedging strategies available to firms to reduce their FX risk. Transaction exposure, for example, can be reduced with the use of short-term instruments, FX derivatives, and operational techniques related to payables, receivables, and invoicing.

Companies can also go beyond financial management of risk, by implementing strong research and development activities and differentiating its products in order to achieve inelasticity and reduce their foreign exchange risk exposure.

The accounting standards adopted by firms affect the level of translation exposure and the translation methods required by those standards. In the United States, the Federal Accounting Standards Board specifies when and where to use certain methods.

The balance sheet hedge method for hedging translation exposure focuses on the discrepancies between net assets and net liabilities resulting from FX rate differences. Translation risk in fact arises from these discrepancies.

A firm could acquire an appropriate amount of exposed assets or liabilities to balance any outstanding discrepancy. Foreign exchange derivatives may also be used to hedge against translation exposure.

The most direct method of hedging FX risk is a forward contract. An exporter can in fact sell a set amount of foreign currency for an agreed-upon exchange rate, and the delivery time can go from a few days to 1 year in the future.

Example 13.4 Consider goods from United States to be sold to some European company for 100,000,000 €. To eliminate the FX risk, the exporter can contract to deliver 100,000,000 € to his bank in 30 days in exchange for payment of $110,000,000. Such a forward contract will ensure that the US exporter can convert the money regardless of what may happen to the dollar-yen exchange rate over the next 30 days. However, if the Japanese buyer fails to pay on time, the US exporter will be anyway obligated to deliver the 100,000,000 € in 30 days.

It is advisable for an exporter to enter into forwards with conservative delivery dates. In case the currency is collected sooner, the exporter can hold on to it until the delivery date or can "swap" the old FX contract for a new one with a new delivery date at a minimal cost.

In case of the future completion of some FX deal, it is therefore worth to consider FX options. The option allows the exporter to acquire the right to deliver the agreed amount of foreign currency to the lender in exchange for dollars at a specified rate on or before the expiration date of the option.

The option is similar to a premium paid for an insurance policy. If the value of the foreign currency goes down, the exporter is protected from loss. On the other hand, if the value of the foreign currency goes up significantly, the exporter can sell the option back to the lender or simply let it expire by selling the foreign currency on the spot market for more dollars than originally expected, but the fee would be forfeited.

13.3.3 International Capital Budgeting

The core business of a multinational is to sell its products or services in multiple countries, at a price denominated in the various domestic currencies. This involves a consistent exposure to currency risk.

After the fall of the Bretton Woods system of fixed exchange rates, the exchange rates became very volatile, and multinational corporations may have become increasingly vulnerable to exchange risk.

This is because generally the short-term movements in exchange rates are not accompanied by corresponding changes in prices in various countries of interest (Shapiro 1992).

Globalization and diversification through internationalization lead to a lower cost of capital, which means that more capital projects will have a positive net present value to the multinational firm.

The general APV model is not totally useful for the multinational corporations in analyzing the FX expenditure of some subsidiaries from the perspective of the parent company.

Sometimes a project may have a positive APV from the point of view of the foreign subsidiary, while it has a negative one from the parent's perspective. This could happen, for example, if certain cash flows are blocked by the host country from being legally remitted to the parent or if extra taxes are imposed by the host country on foreign exchange remittances.

Another reason for discrepancies could be a higher marginal tax rate in the domestic market, making the project not profitable for the parent company. By assuming that the foreign subsidiary is owned by the parent company, which in turn is owned by domestic shareholders, cash flows are dependent on the domestic currency.

It is in that currency in fact that the cash flow will have to be converted, in order to benefit the shareholders. Recall that maximization of shareholder's wealth is indeed the objective of the multinational firm.

The model proposed in this section, to overcome the limitations of the classical APV model, was proposed by Lessard (1985). The model is based on the fact that the cash flows will be denominated in a foreign currency to be later converted into the currency of the parent firm.

The model also accounts for non-ordinary and special cash flows that are usually encountered when performing the analysis of foreign projects. The model can be written as

$$\begin{aligned} \mathrm{APV}_{\mathrm{INT}} = & \sum_{t=1}^{T} \frac{E(S_t) C_t^{\mathrm{OP}} (1-\tau)}{(1+r_{\mathrm{WACC}})^t} + \sum_{t=1}^{T} \frac{E(S_t)\tau\delta_t}{(1+r_{\mathrm{D}})^t} + \sum_{t=1}^{T} \frac{E(S_t)\tau I_t}{(1+r_{\mathrm{D}})^t} + \frac{E(S_T) TV_T}{(1+r_{\mathrm{D}})^T} \\ & - S_0 C_0 + S_0 L_0^{\mathrm{RF}} + S_0 D_0^* - \sum_{t=1}^{T} \frac{E(S_t) C_0^*}{(1+r_{\mathrm{D}})^t} \end{aligned} \tag{13.5}$$

where:

$E(S_t)$ is the expected spot exchange rate applicable for year t.
C_t^{OP} is the amount of operating cash flows.
τ is the tax rate.
δ_t is the depreciation at time t.
r_{WACC} is the WACC to discount cash flows once converted in domestic currency.
r_{D} is the cost of debt.

I_t is the amount of interest expenses.
TV_T is the expected after-tax terminal value.
C_0 is the initial investment at inception.
L_0^{RF} is the amount of restricted funds from existing operations.
D_0^* is the amount of concessionary loan at a below-market interest rate.
C_0^* is the amount of concessionary loan payments.

Equation (13.5) clearly shows how the cash flows are initially denominated in the foreign currency and then converted to the currency of the parent company. The expected spot exchange rate is the conversion benchmark.

The higher between the domestic and the foreign tax rate is taken as the marginal tax rate in the model. This is because the model assumes that the tax authority in the parent firm's home country will give a foreign tax credit for foreign taxes paid up to the amount of the tax liability in the home country.

It follows that, for a higher domestic tax rate, the difference with the foreign tax rate represents additional taxes to be paid in the home country. On the other hand, if the foreign tax rate is larger, there is a credit that offsets the domestic tax liability, and additional taxes are due.

The equation also indicates the discount rates with the subscript d. It indicates that once the foreign cash flows are converted into the parent's home currency, the appropriate discount rates are those of the domestic country.

The model entry C_t^{OP} represents the portion of operating cash flows that can be legally remitted to the parent firm. Parts of cash flows that are blocked by the host government are not considered given that they do not provide any benefit to the stockholders of the parent firm. The model does not account for cash flow remitted by circumventing restrictions as well.

The international version of the APV is based on the same rules of the standard model for what concerns revenues and costs. In particular, only incremental revenues and operating costs are considered in calculating the C_t^{OP}.

In order to understand the concept, consider the example of a multinational company with a sales affiliate in some country, which could raise merchandise from the parent company directly or indirectly through some facility.

The company may decide to put a manufacturing facility into operation in the foreign country, so as to increase the overall sales compared with just having a sales affiliate. The downside is that the former manufacturing unit will experience lost sales as a result of the new foreign manufacturing facility.

A process of cannibalization enters into force reducing the profitability of the formerly existing project. The incremental revenue is given by the total sales revenue of the new manufacturing facility net of the loss in revenue from lost sales.

In the different case when sales are lost because a competitor who is better able to satisfy local demand is gearing up, the entire sales revenue of the new foreign manufacturing facility is incremental sales revenue.

The international APV model incorporates additional terms that are usually encountered during the development of foreign projects. For example, the term S_0

L_0^{RF} represents the value of accumulated restricted funds (of amount L_0^{RF}) in the foreign land from existing operations that become available when implementing the proposed project.

There are funds restricted in the foreign country from previous project, and the above variable represents the share of those funds that become available thanks to the new project.

Examples are funds whose use is restricted by exchange controls or funds on which additional taxes would be due in the parent country if they are remitted. The value of L_0^{RF} is given by the difference between their face value and their present value in the best scenario.

Another interesting term to analyze is

$$S_0 D_0^* - \sum_{t=1}^{T} \frac{E(S_t) C_0^*}{(1 + r_{\mathrm{D}})^t}$$

It shows the present value, expressed in the currency of the parent company, of the benefits coming from borrowing at a favorable market rate, when raising funds in the foreign currency.

Concessionary loans at a low interest rate are sometimes available to a multinational firm, when it decides to invest and make capital expenditure in the foreign land. The host country normally offers such an advantageous type of loan in order to attract foreign capitals for economic development and the creation of employment opportunities for its citizens.

The multinational company enjoys the benefit of the difference between the face value of the favorable concessionary loan and the face value of the same loan when issued at ordinary interest rate conditions.

It is clear that taking the difference between an amount discounted at the lower (favorable) interest rate and the same amount discounted at a standard (higher) rate yields a positive NPV for the company.

It should be clear that the present value of the loan payments discounted at the normal borrowing rate represents the size of the loan available from borrowing at the normal borrowing rate with a debt service schedule equivalent to that of the concessionary loan.

The WACC is calculated based on the optimal debt-to-equity ratio. The single project should always be considered as a small portion of the firm, therefore being financed using the same capital mix as the whole company.

When the asset base increases because a capital project is undertaken, the firm can handle more debt in its capital structure. That is, the borrowing capacity of the firm has increased because of the project.

The choice of investing and financing is separate in the corporate finance theory. When the optimal capital structure for the firm is known, one can use it to determine whether a project is viable or not.

It is not true that each and every capital project is financed with the optimal portions of debt and equity. Some projects may be financed with all debt or all equity or a suboptimal combination.

The crucial thing is that in the long term, when it comes to the aggregation of the many undertaken projects over time, the company does not depart too much from the corporate capital structure.

Looking back at the Lessard formula, the interest tax shield term in the model recognizes the tax shields of the borrowing capacity created by the project regardless of how the project is financed.

If another approach was used, then the APV would have changed considerably according to the amount of leverage implied by the project. In international capital budgeting analysis, this is a very important point, given the large use of concessionary loans.

The international APV model equation does not include all possible cash flows encountered in analyzing foreign capital expenditures. The analyst should consider it as a framework to apply to the specific single case with opportune modifications.

By understanding the nature and functioning of the Lessard's framework, one should now have the knowledge to incorporate into the basic APV model terms of a more unique nature for specific cash flows encountered in a particular analysis.

One way to tune the model, for example, is by introducing tax savings and deferrals, due to multinational operations. Some revenues and expenses may be spread among the foreign affiliates so as to reduce the taxable income.

Operations such as transferring of income to low-tax countries, as well as strategies for repatriate as much as possible of the cash flows generated abroad, are examples of how the international APV model can be modified to fit different situations.

All the above cash flow terms, from tax savings or deferrals to the repatriation of restricted funds, can be easily handled in the Lessard framework. The analyst can first analyze the capital expenditure as if it did not exist.

After that, it is possible to consider the additional cash flows separately, with no need to be explicitly included in the model. Additional terms in fact become meaningful only if the initial APV turns out to be negative.

In this case, the analyst can calculate how large the cash flows from other sources needed to make the APV positive and then estimate whether these other cash inflows will likely be that large.

The implementation of the general international APV framework requires to estimate the future expected exchange rate. One method to do so is to recall the purchasing power parity relation.

By using the PPP, the analyst can estimate the future expected exchange rate for period t as

$$E(S_t) = S_0 \frac{[1 + E(i_d)]^t}{[1 + E(i_f)]^t}$$

where:

$E(i_d)$ is the expected long-run annual rate of inflation in the domestic country.
$E(i_f)$ is the expected long-run annual rate of inflation in the foreign country.

Recall that the PPP is a theoretical framework which is not likely to hold in real life. Long-term biases may result in a systematic underestimation of overestimation of the expected exchange rates. However, if there is no suspicion of such a bias, the PPP should prove to be an acceptable tool. Alternatively, the analyst may choose to use long-dated forward prices to estimate the future expected spot exchange rates or use an IRP forecast.

13.4 Summary

The internationalization of business is a further step in the growth of corporations, and it takes the business to another level. Specific conditions must be usually met in order for a firm to go international.

International trade has developed over the years, due to the progressive liberalization of cross-country exchanges of goods and capitals and also due to integration in several areas of the world.

Multinational corporations are big firms that establish their branches worldwide, following the demand for their products or services, after careful consideration of the implications.

Economic, social, and political factors usually drive the decision of getting globalized, and the management of a firm is challenged with important decisions related to the future of the business.

The cost of capital in an international environment is a controversial point of discussion. On one hand the enlargement of the geographical environment leads to diversification that should reduce the risk, making capital cheaper.

On the other hand, a multinational corporation is much harder to control, and it is usually subject to various additional sources of risk, on top of the classic ones, including political risk.

The exchange rate is the key to understand the dynamic of currencies around the world. Through instruments like the purchasing power parity and the interest rate parity, it is possible to establish theoretical relationships among the relevant variables.

The foreign exchange markets are characterized by a high volume of trading, and they define the level of the exchange rate in the world. Foreign exchange risk can be managed through derivatives written on the exchange rate.

International capital budgeting involves the introduction of the exchange rate and other variables into classical present value models. The result is a family of models that capture the value added by internationalization.

Problems

1. Why is capital budgeting analysis so important to the firm?
2. What is the intuition behind the NPV capital budgeting framework?
3. Discuss what is meant by the incremental cash flows of a capital project.
4. What makes the APV capital budgeting framework useful for analyzing foreign capital expenditures?

5. Relate the concept of lost sales to the definition of incremental cash flow.
6. What problems can enter into the capital budgeting analysis if project debt is evaluated instead of the borrowing capacity created by the project?
7. What is the nature of a concessionary loan, and how is it handled in the APV model?
8. What is the intuition of discounting the various cash flows in the APV model at specific discount rates?
9. In the Modigliani-miller equation, why is the market value of the levered firm greater than the market value of an equivalent unlevered firm?
10. Discuss the difference between performing the capital budgeting analysis from the parent firm's perspective as opposed to the project perspective.
11. Define the concept of a real option. Discuss some of the various real options a firm can be confronted with when investing in real projects.
12. How is international financial management different from domestic financial management?
13. How is a country's economic Well-being enhanced through free international trade in goods and services?
14. What are multinational corporations (MNCs), and what economic roles do they play?

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