

## **5. Economic Assumptions**

In developing the economic assumptions for use in an appraisal, a team approach must be used. The investment bankers, external actuaries and the company's financial area research current and historic economic conditions to develop an internally consistent base scenario. To be successful, all parties must be comfortable with this scenario and its implications on production, investment yields and, ultimately, distributable earnings.

### **5.1 Macro-economic Assumptions**

In developing countries, fluctuations in asset values and inflation rates are a familiar part of the landscape. The interest rate term structure may be calculated in terms of years or months instead of decades. However, in order to perform an actuarial appraisal, long-term economic assumptions are needed. Economic conditions are typically projected for several years and held constant for the remainder of the projection period, thus assuming a long-term average is reached.

The external actuaries generally rely on other team members to develop the macro-economic data needed for the projection. Those data needs include gross domestic product (GDP), local inflation, expected yields on local risk free assets and any short-term expected deviation from purchasing power parity (PPP) between the local currency and any "reference" currency used in the appraisal, such as the U.S. dollar. Other items that are useful include expected yields and/or spreads on other asset types which might be included in the seller's investment portfolio.

### **5.2 Assets and Asset Valuation**

Incorporating assets in the valuation of an international transaction in practice starts out the same as a domestic transaction— interest bearing assets are allocated to existing business to facilitate modeling, excess assets are allocated to book value and any shortfall is made up through a capital infusion at time-zero funding the purchase of a notional asset with the same characteristics as assets currently available in the market place.

However, admitted assets in developing markets can be very different from those in developed markets, and that can change the equation dramatically.

Some of the features that make assets difficult to value and project in developed markets (derivatives, asset-backed securities and even simple put/call options) often are not found in developing markets; however, assets in each country have their own distinct character and risk profile.

Assets in inflation-indexed currencies or with yields linked to external indices are among the simplest to model. Although trading volumes can be thin, market values are usually available or can be derived from market data. However, volatility in inflation and currency trading ranges can create greater discontinuities in value than actuaries practicing in developed markets are used to considering.

Valuing assets for which the market is illiquid or does not exist at all poses much greater challenges. For example, in Asia, a much greater percentage of insurance company assets are in illiquid real estate or corporate loans, often made within a closely held corporate holding structure. Further complicating the issue, reserves may be held on an inadequate statutory basis or assets may be impaired. In situations such as these, the challenge is to determine the capital injection necessary to make an appropriate provision for existing liabilities, taking into account current estimated asset market values.

### **5.3 Projected Yields**

There are many reasonable approaches to incorporating existing assets into a valuation model. If time and budget allow, existing assets as of the valuation date can be fully modeled in actuarial projection software and projected with the liabilities. In order to utilize this methodology, future investment strategies must be defined in addition to new money yields on future asset purchases. All things being equal, this is the preferred approach, as it allows for modeling flexibility and precision that other techniques cannot match. Also, this approach facilitates scenario testing that, though seldom used in practice, can be valuable in developing markets.

The downside to this approach is that it is time consuming, expensive and often not practical. Assets backing reserves in many international markets do not lend themselves to a fully-modeled approach. Numerous adjustments to the initial portfolio composition and difficult assumptions about market values may be required. Perhaps for this reason, current international standards of practice do not require—and potential investors are typically not asking for—this type of sophisticated analysis. Thus, simpler methods are often used.

An alternative to the fully-modeled approach is to start with a serial listing of the in-force assets. After validating market value as of the valuation date, assets can be modeled in a spreadsheet, linking any indexed assets to the macro-economic assumptions previously defined. The aggregate cash flows thus created can be input into actuarial modeling software as an asset and run in an asset/liability model. Or, principal and yields at the midpoint of each projection period can be estimated by simply taking a weighted average of coupon rates (net of assumed default rates) and principal remaining. The average principal and yields thus calculated can be applied in different ways. The preferred approach is to fully allocate existing assets to existing business, making up any projected deficit going forward by purchasing assets at new-money rates. New business can then be projected assuming new-money rates (a conservative assumption in a decreasing interest rate environment) or by calculating a true portfolio rate from asset purchases going forward using a defined investment strategy.

Another approach calculates a blended portfolio rate to be applied equally to existing and new business by allocating in-force assets across total projected liabilities. The blended portfolio rate is calculated as a weighted average of projected yields on existing assets and new money rates, based on the ratio of existing assets to total modeled reserves including required capital, incurred but not reported claim reserve (IBNR), etc. This methodology may be iterative if the liabilities in the model are dependent on the portfolio yield and less transparent than the approach described previously.

Compared to the fully-modeled approach, spreadsheet methods are blunt instruments. However, given the short duration of assets in developing markets, lack of interest rate risk and the amount of variance inherent in other model assumptions, most investors appear satisfied with in-force asset yield estimates calculated in spreadsheets.

#### **5.4 Projection Currency**

Appraisals are almost always performed on a nominal basis in the local currency. The main exception to this is in economies where the currency for financial transactions is inflation-indexed, such as the *Unidades de Fomento* (UF) in Chile.

Modeling on a real basis can have a negative impact on modeled value if the company has inflation-indexed products. In Latin America, inflation

adjustments are typically performed once per year and account only for the previous year's inflation. Appraisals performed on a real basis will not capture the income "notch" consisting of the difference between the inflationary income of the current year and the existing face amount, which lags on average a half year behind.

Performing projections in the local currency facilitates model development and reconciling the model to historic experience. However, present values will often be presented in a reference currency that bidders are expected to be comfortable with, such as U.S. dollars. Discounting assuming PPP facilitates the conversion to the reference currency. Given local market inflation expectations and any short-term expected deviations from PPP, converting nominal cash flows into the present value of a reference currency as of the valuation date is a straightforward matter.

## **5.5 Risk Discount Rates**

In theory, the risk-discount rate is the risk-free rate increased by the risk premium necessary to compensate the investor for the risk that actual returns might vary negatively from those expected. In practice, discount rate assumptions can vary greatly between bidders based on their strategic considerations for the use of capital.

Appraisal values are generally presented in the actuarial report using a range of risk-discount rates, which are intended to cover most reasonable risk-discount scenarios. These are provided to aid potential investors in assessing the effect on value of various risk-discount rates taking into account different investor expectations and perceptions of risk. Ultimately, each potential investor will determine their own risk-discount rates based on long-term return expectations, cost of funds, internal hurdle rate, tax considerations, competitiveness of the bidding process and their perception of country, market and overall transaction risk. Finally, potential investors may apply different discount rates to existing blocks and new business projections, as the emergence of earnings on an existing block is considered to be less risky than the projected income deriving from new business sales.

Discount rates thus selected can be justified from the bottom up using Capital Asset Pricing theory, but in practice they tend to be set more from the top down using a Delphi Method form of consensus building. Discount rates set in this manner are influenced by many intangibles in addition to determination of

the local risk-free rate, country equity risk and industry beta, which are themselves subject to a significant degree of subjective interpretation in developing markets.

Despite a number of global political and financial crises in the 1990s (Mexico in 1994, Barings in 1995, Asia and Long-Term Capital in 1997, Russia in 1998, Brazil throughout), discount rates used in international transactions trended downward in the late 1990s and early 2000s. This was due not only to falling interest rates in developed nations, but was the predictable result of increased competition for the limited number of high-end properties available in developing markets. However, a current capital shortage in the industry due to significant declines in global equity markets and massive bond defaults appears to have whetted the appetite for international investment, at least for the time being. As companies review their international strategy, the resulting upward pressure on discount rates will be further exacerbated as executives incorporate the implications of September 11, the economic collapse of Argentina and a general increase in geopolitical instability into their perceptions of the risks of investing internationally and desired investor returns.

## 5.6 Discounting Cash Flows

In many instances, investor expectations in developing countries contemplate an improvement in future economic conditions. This often leads to the selection of a declining inflation scenario, coupled with declining real-investment yields. This has a number of implications on the calculation of discounted cash flows.

Investors in industrialized nations are often used to seeing results presented using nominal discount rates. This is appropriate if the economic environment and, in particular, the inflation rate are projected to be level. However, if economic conditions are projected to improve while inflation rates decline, a high nominal rate appropriate for the first years of the projection may unduly penalize earnings in later years. Thus, in developing markets, real-discount rates are often used. When the real rate (selected using the strategies discussed previously) is multiplied by the inflation rate, the resulting nominal discount rates going forward decline with the inflation scenario.

Taking this premise a step further, if investor expectations are that the economy will improve (thus implying a reduction in country risk in the future), it would therefore be appropriate to reduce the projected *real*-discount rate used

to discount future earnings. Looking at this from an embedded value standpoint, if the macro-economic assumptions that project an improving economy are achieved, the discount rate for an embedded-value calculation in the future would be reduced accordingly. If the financial performance of a potential investor is measured to some degree by embedded-value considerations, using this approach could give them a significant edge in the bidding process.