Acknowledgements

The publisher acknowledges and thanks the following for their learned assistance throughout the preparation of this book:

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BDO LLP
BERKELEY RESEARCH GROUP
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KING & SPALDING LLP
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MCDERMOTT WILL & EMERY UK LLP
NERA ECONOMIC CONSULTING
ONE ESSEX COURT
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Preface

This fourth edition of Global Arbitration Review’s *The Guide to Damages in International Arbitration* builds on the successful reception of the earlier editions. As explained in the introduction, this book is designed to help all participants in the international arbitration community understand damages issues more clearly and to communicate those issues more effectively to tribunals to further the common objective of assisting arbitrators in rendering more accurate and well-reasoned awards on damages.

The book is a work in progress, with new and updated material being added to each successive edition. In particular, this fourth edition incorporates updated chapters from various authors and contributions from new authors, including a chapter on damages issues in light of covid-19. This fourth edition seeks to improve the presentation of the substance through the use of visuals such as charts, graphs, tables and diagrams; worked-out examples and case studies to explain how the principles discussed apply in practice; and flow charts and checklists setting out the steps in the analyses or the quantitative models. The authors have also been encouraged to make available online additional resources, such as spreadsheets, detailed calculations, additional worked examples or case studies, and other materials.

We hope this revised edition advances the objective of the earlier editions to make the subject of damages in international arbitration more understandable and less intimidating for arbitrators and other participants in the field, and to help participants present these issues more effectively to tribunals. We continue to welcome comments from readers on how the next edition might be further improved.

**John A Trenor**
Wilmer Cutler Pickering Hale and Dorr LLP
November 2020
Part IV

Industry-Specific Damages Issues
Damages in Financial Services Arbitration

Erin B McHugh and Robert Patton

Introduction

Financial services disputes are increasingly resolved through international arbitration proceedings. By 2019, for example, disputes relating to the banking and finance sector accounted for nearly one-third of all cases administered under the London Court of International Arbitration rules. Looking ahead, a 2018 Queen Mary International Arbitration Survey found that more than half of respondents (56 per cent) anticipated an increased use of international arbitration in banking and finance disputes. According to the survey, this could ‘be read as a clear indication that financial institutions and their counsel are contemplating arbitration with much greater interest than ever before’.

In many such matters, the parties to a financial transaction (e.g., an acquisition or a loan) have agreed in the transaction documentation to resolve any disputes that may arise in an international arbitration forum. In addition, a number of recent investor-state disputes have involved claims that a government action adversely affected the value of a financial instrument held by a foreign investor – and that the instrument in question is an investment protected under a bilateral or other international investment treaty. A number of investment treaty claims have focused on actions by a national regulator or alleged deficiencies in financial regulation, reflecting the fact that many banks and other financial institutions are subject to a high degree of regulatory oversight.

Even in arbitrations involving parties outside the financial services sector, financial instruments may be highly relevant to questions of quantum or liability. Swaps, futures and forwards (discussed below) are examples of derivative instruments used by companies in many sectors to hedge market risks arising from exposures to interest rates, foreign

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1 Erin B McHugh and Robert Patton are associate directors at NERA Economic Consulting. The authors would like to thank Eugene Ng for research assistance and Bradley Heys, Timothy McKenna, David Tabak and Ivelina Velikova for useful comments on earlier drafts.
exchange rates, fluctuations in the prices of goods purchased or sold, and other market
variables. In these disputes, an understanding of the financial instruments employed can be
critical to a proper assessment of relevant economic and valuation questions.

Given the diverse array of financial instruments and transactions, and of the contexts in
which they might be germane to a dispute, there can be no one-size-fits-all approach to the
applicable economic and valuation analyses. In this chapter, we outline the characteristics of
and valuation principles for some of the most common types of financial instruments and
discuss how these can be relevant in the context of legal disputes. We then turn to a hypo-
thetical case study to illustrate how some of these concepts may be implemented when
estimating quantum in a financial services dispute.

Valuation of financial instruments

Other chapters in this book discuss general valuation approaches for companies and
projects, including the discounted cash flow (DCF) approach. These approaches reflect
the general principle that the value of a financial instrument – whether an interest in a
business, for example, or a derivative instrument – can be determined as the discounted
value of the expected future cash flows to its holder. The DCF approach, an example of the
‘income approach’ to valuation, involves estimating future cash flows and discounting them
to a present value, as at a valuation date. The market (or comparables or relative valuation)
approach, which can be used as an alternative or complement to the income approach,
relies upon the assumption that the observed market values of comparable companies or
assets reflect the market’s expectations in respect of future cash flows and discount rates.
Valuation multiples for the comparable companies are used to value the company or asset
of interest.

The approaches that are appropriate for valuing a financial instrument are in many
cases similar to those used to value a company or project. For example, many financial
instruments can be valued using a DCF or similar approach. To apply this methodology,
however, one needs to understand how the financial instrument works (i.e., what cash
flows are paid and in which circumstances). It is also critical to understand the risks associ-
ated with those cash flows. All else being equal, the riskier the cash flows, the higher the
discount rate that should be applied to them (and hence the lower their value today). A
relative valuation approach may also be used if there are market prices of a similar financial
instrument available.

Thus, the application of these valuation approaches may differ substantially depending
on the type of instrument being valued and its contractual features. In the next section,
we provide an overview of common financial instruments and their valuation considera-
tions. We first discuss the valuation of equity and debt, both traditional sources of financing
for companies. The tools of company valuation can be applied to value these claims on a
company’s assets.

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4 The discount rate reflects the rate of return demanded by investors to hold a particular financial instrument.
All else being equal, the riskier the investment, the higher the expected return demanded by investors.
We then discuss derivative instruments (often referred to simply as derivatives), which vary widely in their contractual features, with corresponding variation in the applicable valuation techniques. We introduce basic tools of derivatives valuation, which can in some cases be extended and adapted to value more complex derivative instruments.

**Common financial instruments and valuation considerations**

**Equity**

An equity investment represents an ownership interest, for example in a company.\(^5\) The value of equity in a company reflects the company’s assets and expected future cash flows after its debt obligations are satisfied. This residual ownership interest therefore ranks below debt in the priority of claims on a company’s assets and is generally perceived as a riskier investment than debt.\(^6\) See Figure 1, below.

**Figure 1: Illustration of capital structure of a company**

Investors holding equity (equity holders or shareholders) demand a higher expected rate of return to compensate them for bearing this additional risk. Equity holders benefit from potential upside, that is to say, the possibility for appreciation of their investment should expected future cash flows increase.

An equity investment may be in shares of a publicly listed company – which may be traded on a stock exchange or in the over-the-counter market – or in a privately held company (private equity).\(^7\) Companies may make periodic income (i.e., dividend) payments to shareholders. Shareholders realise value by way of these dividends or through capital gains on the sale of the equity stake.

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5 Equity may also refer to an ownership interest in another type of asset. For example, collateralised debt obligations typically have an equity tranche.

6 In some contexts, it may be relevant to distinguish between different types of equity: for example, preferred shares typically rank higher in the priority of claims on a company’s assets than do common/ordinary shares.

7 In the over-the-counter market, transactions are conducted by parties bilaterally or via interdealer brokers.
It is common to value an equity investment using a DCF approach. For example, free cash flow to equity (FCFE) is a measure of the cash flow earned by a company that is available to be paid out to equity holders (after deducting, inter alia, capital expenditures and payments due to holders of the company’s debt). Expected future FCFE is discounted at the company’s cost of equity.8

The market approach can also be used in valuing equity. If the shares in question are traded publicly, then the observable market prices may potentially be used (as discussed further below). Relative valuation approaches are also common: the price of a publicly traded comparable company’s shares may be compared to its earnings, for example, to obtain a price-to-earnings (P/E) ratio. This can then be applied to estimate the value of a privately held company, based on its earnings (potentially subject to additional adjustments).

Application of a P/E or other ratio effectively assumes that the expected growth in cash flows and appropriate discount rate are similar for the company being valued as for the comparator company (or companies). One advantage of the income approach is that such assumptions (e.g., growth rates, discount rates) are made explicit. However, a potential advantage of the market approach is that, in certain respects, it relies on observed market prices rather than assumptions made by the valuer. Often, more than one approach is used to cross-check a valuation. If multiple approaches yield a similar result, this may lead to a higher degree of confidence in the valuation.

Debt

Debt, in general terms, is an amount owed by one party to another in respect of money that has been borrowed. A bond is an example of a debt security. When one buys a bond at issuance, one is effectively loaning money to the bond issuer (such as a company, sovereign government or municipality). Bonds may also be traded subsequently in the secondary market. Cash flows received by a bondholder typically include both interest payments (also called coupon payments) and the repayment of principal (or face value). See Figure 2, below.

Figure 2: Illustration of cash flows and pricing for a bond

An alternative to valuation using FCFE is the ‘dividend discount model’, which values a company’s equity by discounting expected future dividend payments. Which approach is most appropriate may depend on the size of the company’s dividend relative to its FCFE, among other factors.

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8 An alternative to valuation using FCFE is the ‘dividend discount model’, which values a company’s equity by discounting expected future dividend payments. Which approach is most appropriate may depend on the size of the company’s dividend relative to its FCFE, among other factors.
The potential upside for a bondholder is typically limited (for example, the most the bondholder in the above example can receive is the agreed interest payments as well as the repayment of principal). However, as previously noted, bondholders rank higher than equity holders in the priority of claims on a company’s assets, making debt investments generally less risky than equity investments. There can also be different tranches of bondholders with different levels of claims; for example, senior secured debt is debt secured by assets pledged as collateral. This type of debt ranks higher in the capital structure than senior unsecured debt (see Figure 1, above).

Bonds are typically issued at a price equal to par (face) value, with the coupon set equal to the market’s required yield. Thereafter, a bond’s value may change, depending, for example, on changes in market interest rates. Yield measures are often used to evaluate the rate of return on bonds. For example, the yield-to-maturity is a measure of the internal rate of return on contractual cash flows through the maturity date of a bond and can be thought of as the market’s implied discount rate. Some bonds may have observable prices from secondary market trading that can be used to determine value (as discussed further below). Alternatively, bonds may be valued using an income approach.

The applicable discount rates to be applied to future contractual cash flows (i.e., the agreed interest payments and repayment of principal) are a function of the general level of interest rates as well as factors such as issuer-specific credit risk (i.e., the perceived risk of default on agreed payments). The degree of credit risk associated with the issuer is largely a function of the issuer’s ability and willingness to make the agreed payments. All else being equal, the greater the risk of default, the higher the applicable discount rates to be applied to future contractual cash flows (and hence the lower the value of the bond). Observed trading in comparable instruments (e.g., yields implied by trading prices in similar bonds issued by companies with the same credit rating in the same industry) can provide information relevant to determining an appropriate discount rate (in effect, a relative valuation approach).

Another common example of a debt instrument is a loan. In a mortgage loan, for example, funds are typically borrowed by an individual from a bank and secured by real property. Like bonds, loans can also be valued using an income approach. Valuing a mortgage loan entails forecasting the relevant cash flows (interest and principal payments) and assessing default and other risks (i.e., similar considerations to those that apply when valuing a bond). In some cases, traded securities and other transactions may provide information about the value of loans; for example, banks may sell portfolios of whole loans, or bundle and sell mortgage loans as mortgage-backed securities. Transactions involving these securities can provide information relevant to valuing mortgage loans.

Derivatives

Derivatives are financial instruments for which the cash flows to which the holder is entitled – or is required to pay – depend on (derive from) the performance of one or more underlying items, such as securities, indices or rates. Cash flows received or paid in respect of a derivative are generally determined with reference to a specified payment formula.

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9 There are also other yield measures that may be appropriate for certain types of bonds (e.g., callable bonds).
Derivatives and similar contracts are often used by non-financial businesses, as well as by financial institutions, to hedge market risks. By the mid 19th century, for example, farmers in the US Midwest were entering into contracts for the future sale of grains and other crops, once harvested, at pre-specified prices. These agreements (forerunners of modern forward or futures contracts, discussed below) helped to protect the seller from the risk of a subsequent downturn in prices – though such a contract would also have precluded the seller from enjoying upside from a commodity price increase. Further examples of how businesses can hedge risk with derivatives include the use of interest rate swaps to lock in a fixed-rate interest obligation in place of a variable rate, and the use of currency futures to hedge foreign-exchange rate risk.

Derivatives may also be employed by investors seeking to profit from an anticipated movement in the underlying items referenced. We have mentioned the example of a farmer seeking to lock in a later selling price to guard against the risk of a decline in the price of an agricultural commodity; on the other side of such a contract could be an investor speculating that the price of that commodity will rise. If the price were to rise, this investor would profit by purchasing the underlying commodity in the future at the pre-agreed price, then selling at the (higher) market price. Similarly, investors in derivatives may seek to profit from anticipated changes in interest rates or foreign exchange rates.

There exist today a wide variety of derivatives, including more complex securities that combine different types of basic derivatives products, and that may reference multiple underlying variables. Some of the most common derivatives are the following:

- In a swap, two counterparties agree to exchange cash flows. For example, in a ‘plain vanilla’ interest rate swap, one counterparty agrees to make interest payments on a specified notional amount in a specified currency at a fixed rate, while the other agrees to make interest payments on that same notional amount at a floating rate. When initiated, a swap typically has zero net present value (i.e., the present value of the expected future cash flows to be paid by each counterparty are equal). Thereafter, the value of the swap will change with interest rate movements. A risk that attaches to this type of instrument is counterparty risk, the possibility that the party on the other side of the transaction will fail to pay amounts due. This is related to credit risk, but is particularly relevant in derivative transactions such as swaps where it is not clear at the outset of the transaction which party will end up making cash payments in each period.

- Both futures and forward contracts represent agreements to transact in a specified asset at a specified time in the future at a currently agreed price. A futures contract is standardised, trades on an exchange and is typically marked to market daily; an arrangement that minimises counterparty risk. A forward contract is a bilateral agreement.

- A call (put) option gives the holder the right, but not the obligation, to buy (sell) an underlying asset at a specified price (the exercise price or strike price) on (and, in some cases, before) a specified date. The underlying asset may be shares of stock, but could also be a commodity or interest rate, for example. At maturity, the pay-off to the holder

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10 Some academic research finds that contracts functionally similar to forwards and options were traded as early as the 16th and 17th centuries. A fascinating discussion is found in Geoffrey Poitras, ‘From Antwerp to Chicago: the History of Exchange-Traded Derivative Security Contracts’, Revue d’Histoire des Sciences Humaines 2009/1 (no. 20), pp. 11 to 50.
of a call option will either be zero (if the market price is less than or equal to the exercise price – i.e., if the contract is out of the money) or positive (if the market price is greater than the exercise price – i.e., if the call option is in the money). Conversely, at maturity, the pay-off to the holder of a put option will be either positive (if the market price is less than the exercise price) or zero (if the market price is greater than or equal to the exercise price).

As with other instruments, methods for valuing derivatives estimate the present value of expected future cash flows to be paid given the information available at the valuation date. However, the appropriate methodology must reflect the contractual terms of the derivative being valued. For example, the value to either party of a plain-vanilla interest rate swap, in which one party pays a fixed interest rate and the other pays a floating rate, depends on the relative expected values of these two streams of interest payments. As noted above, such contracts are typically constructed such that, at inception, the expected value of the two streams of payments are equal to one another. However, relevant market interest rates may subsequently change. If, for example, expected interest rates increase subsequent to the inception of a plain-vanilla interest rate swap, then the swap will have a positive value for the floating-rate receiver (fixed-rate payer) and a negative value for the floating rate payer (fixed-rate receiver). Expectations about future interest rates can be derived from the term structure of interest rates or ‘yield curve’ (i.e., from market interest rates for otherwise similar instruments with different maturities).

The valuation of an option must take account of uncertainty about the future price path of the underlying asset. The value of a call option to buy shares, for example, depends on expectations about what gains (if any) the option holder may be able to enjoy by exercising the option. This, in turn, depends on expectations about whether and by how much the option will be in the money before its expiry, which is a function of anticipated movements in the underlying share price relative to the strike price. Even a call option that is not currently in the money can have value based on the possibility that the price of the underlying shares will increase sufficiently that it exceeds the strike price prior to expiry.

This implies that the value of an option will depend on the current price of the underlying asset as well as the strike price. Option value will also depend on the anticipated volatility of the underlying asset and on how much time remains until expiry, as these factors are relevant to the probability that the option will move into the money – or deeper into the money – prior to expiry.

The Black-Scholes model is commonly used to value options. It is derived from the observation that, under certain assumptions, the expected pay-off to the holder of an option can be simulated by combining positions in the underlying shares and risk-free borrowing instruments (such as short-term government securities). Under these assumptions, the value of the option equals the value of this replicating portfolio, which can be calculated from publicly available prices. Binomial trees and Monte Carlo simulations are other commonly used valuation methods applicable to certain derivatives.

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11 It follows that the risk-free rate of interest is a determinant of option value in the Black-Scholes model, in addition to the variables mentioned immediately above (the market price of the underlying shares, the strike price, the expected volatility of the underlying shares and the expiry date).
As reflected in the above discussion of derivatives, the choice of valuation methodology depends on the characteristics of the financial instrument being valued. The following sections discuss the choice of valuation approach in more detail.

Choice of valuation approach
The appropriate methodology for valuing a financial instrument will depend on the nature of instrument and the data available. For a financial instrument traded in a highly liquid and transparent market, the use of observable market prices may be most appropriate. In such a case, the trading price reflects the consensus market view as to future cash flows and related risks. However, if trading in a particular security is not sufficiently liquid, then observable market prices may not reflect the value of the instrument.\textsuperscript{12} Liquidity risk refers to the risk that one will not be able to exit a position in a financial instrument at limited cost and in an adequately short timeframe.\textsuperscript{13} All else being equal, market participants are willing to pay less for financial instruments that are less liquid (illiquidity discount).

Some financial instruments (e.g., many bonds and derivatives) are not traded on an exchange and may not have observable market prices. In such cases, the value of the instrument may need to be estimated using a DCF or other valuation model. Different experts may employ different valuation models or inputs to the same models, resulting in differences in the valuations arrived at. Experts may also differ in the adjustments they make to reflect market conditions on the valuation date (e.g., adjustments for illiquidity).

To illustrate the implementation of some of these valuation concepts, we now discuss a hypothetical case study centring on one of the financial instruments discussed above, mortgages.

Sylvania Bank v. The Republic of Freedonia
Our hypothetical case study centres on the mortgage market in the (fictional) Republic of Freedonia. In Freedonia, thousands of retail customers have entered into mortgage loans denominated in the currency of Sylvania, another fictional country nearby where interest rates are lower than in Freedonia. These loans were issued by branches of Sylvania Bank located in Freedonia. The Freedomian borrowers of these loans generally have assets and income denominated in their domestic currency, but monthly mortgage payments denominated in Sylvania’s currency.

\textsuperscript{12} The International Valuation Standards Council defines ‘market value’ as ‘estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm’s-length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion’. International Valuation Standards Council, Glossary updated March 2020, available at https://www.ivsc.org/standards/glossary. If, for example, the most recent observable market price as at the valuation date reflects a transaction that occurred well before that date, and market conditions changed in the intervening period, that observable market price may not correspond to the consideration that would be paid on the valuation date.

\textsuperscript{13} See, e.g., the definition of ‘liquidity risk’ in the UK Financial Conduct Authority Handbook, available at https://www.handbook.fca.org.uk/handbook/glossary/G1555.html.
Owing to a market disruption, the currency of Sylvania appreciates by 40 per cent against that of Freedonia. Correspondingly, the outstanding loan principal and monthly payments of the Freedonian borrowers increase sharply in domestic currency terms. To provide relief to these retail customers, the Freedonian government enacts legislation to redenominate the loans to the Freedonian currency and makes this measure effective retroactively, as of the loan origination date. This substantially lowers the expected future monthly payments on Sylvania Bank’s portfolio of Freedonian mortgage loans. Sylvania Bank is not compensated for this lowering of payments.

In response, Sylvania Bank, which is headquartered in Sylvania, filed an international arbitration claim against Freedonia, alleging that the retroactive conversion (the ‘disputed measure’) violated the guarantee of fair and equitable treatment to foreign investors under the Sylvania–Freedonia bilateral investment treaty. In particular, Sylvania Bank claimed that the value of its mortgage loan portfolio declined as a result of the Freedonian government’s action and that it is entitled to damages as compensation for the loss of value.\(^\text{14}\)

This case raises a number of interesting economic questions that do not necessarily bear directly on quantum: for example, were the contracts, which carried substantial foreign exchange risk, suitable for the consumers who entered into them? Here, however, we focus on the quantification of damages assuming liability. In particular, we walk through a series of questions arising in our hypothetical dispute, which exemplify issues that an arbitrator would need to consider when evaluating damages estimates put forward by an expert.

**What framework should be used to estimate damages?**

As in many financial services arbitrations, estimating damages in this hypothetical matter requires a valuation analysis. To estimate the magnitude (if any) of the claimed decline in value of the mortgage loan portfolio, the quantum expert would compare the value of the mortgage portfolio, taking account of the redenomination of the loans (i.e., the ‘actual scenario’), to the value of the mortgage portfolio had Freedonia not imposed the disputed measure (i.e., the ‘but-for scenario’).

**What is the valuation date?**

The appropriate valuation date may be a point of contention between the parties to an arbitration. From the expert’s perspective, the valuation date may be a matter of legal instruction. To minimise points of difference between the parties’ experts, it may be optimal for the experts to be directed to use the same valuation date (e.g., the date of the alleged breach, in this case the date of the enactment of the disputed measure).

A related question is whether the use of hindsight is appropriate: should the damages analysis consider developments subsequent to the valuation date, or only what was knowable as at that date? This question too may be one on which the experts are instructed. Whether hindsight is used can substantially affect the assessment of quantum: for example, should

\[^{14}\text{Note that there could potentially be other categories of alleged damages (e.g., administrative costs incurred by Sylvania Bank in amending the loan agreements to take account of the redenomination). For the purposes of this chapter, we focus on the diminution in value of the loan portfolio.}\]
inputs such as interest rates be based on expected rates as at the valuation date or on realised rates knowable only subsequently? A detailed discussion of this issue is outside the scope of this chapter and is not specific to financial services disputes.

How should the loans be valued?

As with other financial instruments, a mortgage loan can be valued by estimating the discounted value of expected future cash flows as at the valuation date (i.e., using a DCF approach). The inputs to this approach typically include the contractual cash flows, adjustments to those contractual cash flows (discussed below) and discount rates used to convert expected future cash flows into a present value.

Contractual cash flows on mortgage loans include interest payments and the repayment of principal. The profile of these cash flows depends on factors including the maturity date of the mortgage and whether the mortgage is a principal-and-interest mortgage or an interest-only mortgage (where principal is repaid only at the maturity date).

If pricing data were available for prior arm’s-length transactions involving the same or similar mortgages (or, for example, in mortgage-backed securities), these data could potentially be used to value the mortgages at issue. As previously noted, the extent to which these transaction prices would represent a reliable measure of value for the mortgages at issue would depend on the liquidity of the market. One would also need to consider any differences between the mortgages that were transacted and the mortgages at issue.

What are the types of risks associated with cash flows?

Risks associated with mortgage loans include credit risk (i.e., the risk that the borrower will not repay the loan) and prepayment risk (i.e., the risk that the borrower will repay the loan prior to maturity, which changes the stream of expected future interest and principal payments). Depending on the contractual term of a mortgage, there may be interest rate risk (i.e., the risk that interest rates change).

As in any DCF model, risks may be accounted for either by adjusting the estimated future cash flows or by adjusting the discount rate. However, risks should not be double counted: for example, if ‘haircuts’ were applied to expected cash flows to fully reflect the expectation that some of the loans in the portfolio reasonably would be expected to default, it would not be appropriate to also add a premium to the discount rate to reflect this same risk.

What are key differences between the valuation inputs in the actual and the but-for scenarios?

Most obviously, the monthly contractual payments on the mortgages are lower in the actual scenario than in the but-for scenario. This stems from the Freedonian government’s change to the terms of the mortgages. Incorporating only that factor, the present value of the mortgages would unambiguously be lower in the actual scenario than in the but-for scenario.

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15 Depending on the contractual term of a mortgage, there may be interest rate risk (i.e., the risk that interest rates change).
However, other differences between the two scenarios would need to be considered. Notably, the probability of default is likely to be higher in the but-for scenario than in the actual scenario. This is because, absent the disputed measure, many borrowers were expected to have difficulty making the higher monthly payments following the appreciation of Sylvania’s currency against Freedonia’s. Higher expected defaults serve to reduce total expected cash flows from the mortgages, thereby reducing their value. All else being equal, the higher the expected default rates in the but-for scenario (i.e., absent Freedonia’s intervention to alter the mortgage contracts), the lower the present value of the mortgages in that scenario, and hence the lower the estimated damages.

Thus, although the disputed measure reduced the present value of the mortgages under the assumption that all contractual payments are made, the disputed measure may also have had an (at least partially) offsetting benefit to Sylvania Bank by lowering the probability of default associated with the mortgages. See Figure 3, below.

Figure 3: Comparison of factors influencing expected future cash flows in but-for and actual scenarios

An expert might assess quantum, assuming liability, as the net effect of the harm to the bank from the lower payments and the benefit from the reduced default risk. This would entail predicting defaults in the two scenarios. The extent to which any default will affect cash flows will be a function of the assumed loss given default, which in turn will be a function of the likely recovery from sale of the property collateralising the loan. Other factors would likely also need to be considered, including any effect of the disputed measure on the propensity of the mortgage holders to prepay their mortgages. An understanding of the bank’s hedging strategies may also be important to an assessment of quantum, as any relevant foreign exchange hedging contracts the bank entered into may need to be factored into an assessment of the effect of the disputed measures.

There are several potential approaches to assessing the effect of the disputed measure on default rates; for example, experts may make use of historical data and statistical techniques. Factors that one might reasonably expect to affect the probability of default include both loan-level variables (e.g., loan-to-value ratio) and borrower-level characteristics (e.g., credit scores). Questions that an arbitrator may consider when evaluating a model such as this include the following:

• Which historical data were used to develop the model?
• Are there any material differences between the period over which the model is estimated and the forecast period, for example with respect to default rates or the determinants of default rates?

• What statistical technique has been used? Has the expert presented relevant statistics to evaluate the explanatory power of the model? For example, if a regression analysis was used, has the expert provided an economic rationale for the explanatory variables that have been selected? Has the expert provided statistics such as the R-squared, adjusted R-squared and t-statistics for the coefficient estimates? Are the coefficient estimates statistically significant? Is the sign of each coefficient (i.e., positive or negative) economically logical? Has the expert performed a sensitivity analysis to show the effect of reasonable adjustments to different inputs to the model?

• Are there other approaches that could be used to buttress the model results?

Event study as a cross-check

The DCF approach to quantum set out above is an application of the income approach. If Sylvania Bank was traded publicly during the relevant time, then an expert may be able to use a variant of the market approach as some degree of cross-check on the assessment of quantum. In particular, it may be possible to use an event study, which measures the change in a company’s share price and market value following a defined event or announcement.

An event study is a well-established empirical technique that is used to measure the market’s assessment of the effects of a specific event or announcement (here, for example, the disputed measure) on a company’s market value. An advantage of the event study method is that it employs actual market data rather than potentially subjective assumptions.

Event studies have been developed in academic literature and applied in a variety of contexts to measure the price movement of a security in response to new information. Economists have used event studies to assess the effects on firm value of policy measures such as new regulations or changes in monetary policy; to gauge the market’s expectation of the benefit or harm to companies from a merger or acquisition; and to measure the effects on share prices of corporate events, such as stock splits or earnings announcements.

The premise of an event study is that a company’s share price equals the market’s estimate of the present value of the cash flows expected to accrue to holders of the shares. When used for the purposes discussed in this chapter, it also depends on the assumption that a company’s share price reflects all publicly available information and adjusts quickly to any new relevant information (i.e., semi-strong market efficiency).

16 R-squared and adjusted R-squared are both measures of the ‘goodness-of-fit’ of a regression model. A t-statistic can be used to determine whether a coefficient estimate is statistically significant.

17 An efficient market is one in which the price of an asset (such as a company's shares) reflects all information available to the market and reacts immediately to incorporate any new information relevant to the value of that asset. If a company's shares trade in an efficient market, then when the market receives new information about future economic conditions in general, or relevant to the future earnings or cash flows of that company in particular, the price of the shares will change rapidly to assimilate this information. See, e.g., Burton G Malkiel, ‘Efficient Market Hypothesis’, New Palgrave Dictionary of Money and Finance, Vol. 1 (New York, Stockton Press, 1992). The academic literature on the Efficient Market Hypothesis distinguishes three principal concepts of efficiency, differing according to the sort of information that must be reflected in a security's price for the market to be deemed efficient: If a market is ‘weak-form’ efficient, current share prices...
In an event study, the expert observes how the price of a security moved during a defined window of time around the event being studied. Under certain conditions, discussed below, the researcher can then isolate the effect of the event from other factors that might also influence the price. The event study can convey information about how an event caused the market to revise its expectations for a company’s performance (i.e., how expected future cash flows changed as a result). The technique has been most frequently applied to shares of stock (or equity), though it can also be applicable to debt instruments and other securities.

An event study proceeds in several defined steps. First, the event or events to be examined must be identified. The information conveyed by the event should be well defined, and it should be possible to pinpoint when this information reached the market. It may be that multiple announcements conveyed the relevant information. Careful consideration should be given to whether the market anticipated the event, in part or in full, and, if so, what the implications of this are for the interpretation of the event study.

Because the goal of an event study is to analyse whether, and by how much, the price of a share responded to a particular event, the analysis will typically control for other factors that may also have affected the price during the window of time over which the effect of the event is being measured. A standard technique involved in carrying out an event study is thus estimating a ‘market model’, a statistical model that characterises the relationship between changes in the share price of interest and changes in the broader market or in the share prices of other companies in the same industry, or both.

The market model is then used to generate a predicted return (i.e., an estimate of the change in the share price that would have occurred in the absence of any relevant company-specific event). The difference between the actual observed change in the share price and the predicted return is the excess return (or ‘abnormal return’). This is the price change unexplained by market and industry factors and potentially attributable to the event being studied.

Economists use standards of statistical significance to determine the threshold at which it makes sense to conclude that an excess return is sufficiently large that it is very unlikely to have occurred by chance (i.e., the excess price movement is statistically significant). Absent any other company-specific news released concurrently that could have also affected the price of the shares, one may draw an inference that any statistically significant excess return reflect all information about past prices so that future price changes cannot be predicted using past prices. Thus, investors cannot earn risk-adjusted returns greater than those of the overall market, based on knowledge of past and current returns. If a market is ‘semi-strong-form’ efficient, share prices reflect all publicly available information, including not only past prices but also a company’s disclosed financial information and other relevant public disclosures by the company and by third parties. Semi-strong-form efficiency implies that investors cannot earn excess risk-adjusted returns using any information available to the public. Because past prices are part of the set of information available to the public, weak-form efficiency is a necessary condition for semi-strong-form efficiency. ‘Strong-form’ efficiency means that prices reflect not only public information but also private or inside information. It implies that investors cannot earn excess returns based on any public or private information. For a textbook description of the common three-part classification system, see Stephen A Ross, Randolph W Westerfield and Jeffrey Jaffe, *Corporate Finance*, pp. 354 to 357 (7th ed., Irwin, 2005). For the example presented here, semi-strong market efficiency is most relevant.
is attributable to the event being studied. On the other hand, if there is no statistically
significant excess return, that may be an objective indication that the information disclosed
was not important to the market.\textsuperscript{18}

In our case study, if Freedonia’s disputed measure was announced publicly, and had
not been anticipated, then the reaction of Sylvania Bank’s share price could be used as an
indication of the market’s assessment of the effects of the disputed measure on the bank’s
value. Because the event study will reflect all value implications of the announced event,
the event study result would incorporate the market’s assessment of any negative effect of
the disputed measure on expected cash flows from the loans, as well as any offsetting effect
of reduced expected defaults (and any effect on prepayment or loss given default, among
other things).\textsuperscript{19}

An economist can then estimate the change in share price implied by any statistically
significant excess return. By multiplying this per share amount by the appropriate number
of shares, the effect of the event on the company’s market capitalisation can be estimated.

It is observed that Sylvania Bank’s share price dropped by $5 per share on the announce-
ment date. However, an application of the market model shows that $1 of this decline was
attributable to a market and industry decline on that date. The excess return, therefore,
would be $4 per share. See Figure 4, below.

\textsuperscript{18} The absence of a statistically significant price reaction may not necessarily imply zero damages. In the
hypothetical case of Sylvania Bank discussed in this chapter, e.g., if the loss in loan value attributable to the
disputed measure was positive but small relative to the expected cash flows of the bank, this loss may not be
associated with a statistically significant excess return. This might be the case if, e.g., Sylvania Bank were a
large multinational bank and its Freedonian operations accounted for a relatively small proportion of revenue
and value.

\textsuperscript{19} The event study would also include the market’s consensus expectation of any recovery the bank could
obtain in potential arbitration or litigation (including taking account of the probability that the bank
would not prevail on liability). Thus, the measured price effect is the net loss taking account of any such
expected recovery.
If that excess decline were statistically significant at the 5 per cent level (and if it were verified that there was no confounding company-specific news announced contemporaneously), this price decline might be attributed to the announcement of the disputed measure and taken as being indicative of damage to the bank. If Sylvania Bank had 10 million shares outstanding, then the total excess decline in market value would be $40 million (the $4 per share decline times the 10 million shares). This amount could then be compared to the result of the DCF analysis.

**Conclusion**

With many financial services disputes now being heard by international arbitration tribunals, financial valuation techniques are increasingly important in assessing questions of liability and quantum. Even in disputes not directly involving financial institutions, these techniques are often relevant, for example because of the use of derivatives and other financial instruments by non-financial parties. In view of the diverse array of financial instruments and transactions, and of the contexts in which these may be relevant to a dispute, expert evidence on these issues often has a critical role.
Appendix 1

About the Authors

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Erin B McHugh is an associate director in NERA’s London and New York offices, and is a member of the firm’s European finance, litigation and dispute resolution group. She leads projects in the areas of financial economics and valuation. She has consulted on litigation and arbitration matters in various venues (e.g., ICC, ICSID), as well as on internal and regulatory investigations. She has also provided testimony as an expert witness.

Ms McHugh has extensive experience in estimating quantum in matters involving an alleged breach of a contract or investment treaty. She also has considerable valuation experience, including the valuation of financial products (including various derivatives) and business assets (including those in emerging markets). Who’s Who Legal: Arbitration describes Ms McHugh as ‘an experienced expert focusing on the quantification of damages. She has strong capability in the financial sector, with expertise in financial products, investments and derivatives’.

Ms McHugh holds an MBA from the MIT Sloan School of Management and a BA, magna cum laude, in economics and French from Amherst College. She is also a CFA charter holder. Ms McHugh has presented at industry conferences and law firms on various topics, including damages estimation and valuation techniques. She is a co-author of ‘Causation’ in The Investment Treaty Arbitration Review and a co-author of ‘Floating-Rate Mortgage Securities’ in The Handbook of Mortgage-Backed Securities.

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Rob Patton is an associate director within NERA’s securities and finance and international arbitration practice groups. In this role, he applies nearly two decades of experience in economics, finance and valuation to questions arising in legal disputes, public policy, and business.
Who’s Who Legal: Arbitration describes Mr Patton as a ‘knowledgeable, thorough, responsive, objective and fair’ expert who is ‘shockingly well prepared, a great writer and a hell of a witness on the stand’. He has submitted expert reports in multiple venues, including Ontario Superior Court, England and Wales High Court, and the Supreme Court of British Columbia, and has been qualified as an expert witness and testified at trial.

In commercial disputes, including in international arbitration proceedings, Mr Patton has analysed lost profits in matters alleging defamation, breach of contract and other alleged wrongful conduct. Mr Patton’s analyses in commercial disputes combine traditional valuation approaches, such as a discounted cash flow approach, with techniques from finance and economics. In financial disputes, Mr Patton has analysed instruments including shares, bonds, swaps, options and futures.

Mr Patton has published studies of financial regulation and other public policy issues and authored articles on economic and valuation techniques, including event studies. Publications that have discussed or cited his work include Financial Times, Wall Street Journal, Reuters, Financial Post, CFO magazine and Law360.

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