Measuring Economic Damages with Maximum Certainty

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Introduction – Overview: economic damages

Over the past few decades, a growing interdependence among world economies has emerged, bringing with it an ever-increasing amount of cross-border trade of commodities and services, the flow of international capital and the rapid spread of technological innovation. The impact of economic globalisation has led to a substantial rise in commercial international arbitrations as counterparties have selected neutral and independent international arbitration seats to adjudicate their largest commercial disputes. At the same time, the rapid technological progress observed in many complex industries (including energy, telecom, consumer electronics, life sciences, etc) has directly translated into more complicated issues in international arbitrations.

The high stakes and substantial complexity of the industries involved in the ensuing disputes make the accuracy and reliability of the quantification of economic damages more important than ever. Although it is commonly expected that damages assessments satisfy the 'reasonable certainty' standard, parties should seek to quantify damages with the highest level of certainty. With so much at stake, small inaccuracies in a damages calculation can yield drastically different results. Furthermore, to most effectively inform the tribunal, damages experts must maximise the use of the data and information available and apply industry-specific economic principles.

A well-established standard exists for measuring economic damages that requires comparing the financial positions of the claimant in a world where the alleged wrongdoing that caused the injury did not occur (the 'but-for' world) and the actual world,[1] with the resulting difference being the compensation required to make the claimant financially whole.[2] Although seemingly straightforward, properly modelling these two worlds is far from a simple accounting exercise; it requires careful and detailed economic analyses. The fact that the but-for world never occurred drives much of the assessment's complexities. Therefore, constructing the but-for world requires not only disentangling the impact of other concurrent events that may have affected the economic value but also establishing economic and factual causation. It can be equally difficult to observe accurately the actual world because this involves considering any mitigating actions the claimant should have taken and perhaps did take. Correctly observing the actual world also involves considering consumer substitution patterns as the absence of a product or service from the market does not necessarily imply that profits were lost if economic substitutes were available from the claimant.

In addition to sound economic analyses, a damages assessment that ensures the highest level of certainty also requires a full understanding of the industry at the centre of the dispute. The competitive dynamics of an industry and its regulatory constraints, if any, shape the but-for world, mitigation possibilities, consumer substitution patterns and causation analyses. For instance, observing declining subscriber counts for a mobile wireless provider claimant following an alleged improper network upgrade in 2010 is hardly sufficient to establish economic harm if the claimant was the only market participant that did not offer Apple's iconic iPhone.

In the rest of the chapter, we provide the general framework for measuring economic damages (section 2) and discuss the reasonable certainty standard (section 3). Sections 4 and 5 provide stylised examples of commercial disputes where actual economic and industry expertise is critical to constructing economic parameters in the but-for and actual worlds. These sections make clear that a proper understanding of economics and industry dynamics and the interplay between the economic parameters in the lost profit model can ensure the highest level of certainty. Section 6 concludes the discussion.

2. General framework to measure economic harm

In commercial arbitrations, the concept of economic damages describes the level of compensation the claimant would require to be 'made whole'. That is, the damages expert calculates the change in 'economic value' because of the alleged conduct, assuming liability has been proven. Compensating the claimant based on the change in economic value is intended to return it to the position it would have had absent the injury.

2.1 The lost profits model

Economic damages are the consequence of impairing the financial position of the claimant from the alleged wrongdoing. The literature on economic damages establishes a deceptively simple lost-profits model that calculates the difference between the net profit (revenue less incremental costs) the claimant would have earned absent the respondent's alleged wrongdoing (the but-for world) and the amount the claimant received (the actual world). In other words, the lost profits model seeks to make the claimant whole, simulating the claimant's economic circumstances but-for the alleged wrongdoing. Mathematically, the standard lost profits model can be expressed by the following equation:

Lost profits = [$Q_{But\text{-}For}$ x ($P_{But\text{-}For}$ – $C_{But\text{-}For}$)] – [Q_{Actual} x (P_{Actual} – C_{Actual})],

where
- $Q_{But-For}$ is the quantity the claimant would have sold absent the alleged wrongdoing;
- $P_{But-For}$ is the price of the quantity the claimant would have sold absent the alleged wrongdoing;
- $C_{But-For}$ is the incremental costs the claimant would have incurred from procuring and selling the additional quantity absent the alleged wrongdoing;
- Q_{Actual} is the quantity the claimant sold in the presence of the alleged wrongdoing;
- P_{Actual} is the price of the quantity the claimant sold in the presence of the alleged wrongdoing; and
- C_{Actual} is the incremental costs the claimant incurred from provisioning the quantity sold despite the alleged wrongdoing.

By comparing the profits in the but-for and actual worlds, the lost profits model can measure the economic harm caused by the alleged wrongdoing, including lost sales, price erosion, cost increases and even reputational harm, if applicable. The lost profits model can do this because most types of economic harm have a direct financial impact on the claimant's cash flow and overall firm profitability; therefore, a financial value can be derived. For example, lost sales, price erosion and cost increases all directly affect profits. Although not as obvious, reputational damage can potentially lower the price a company can charge or reduce the sales it makes, thus affecting profits. Similarly, damage to property will result in costs to repair that property, thus affecting profits. Hence, although they are not necessarily the same thing, 'lost profits' is often used interchangeably with 'economic harm' because it covers most categories of economic harm. As discussed below, a separate calculation is required to estimate the lost opportunity cost of capital.

2.2 Time frame for calculating economic damages

The lost profits equation implies a single-period model of lost profits. However, real-world disputes often require a comparison of profit streams in the actual and but-for worlds over many years (sometimes decades into the past) and frequently into the distant future. That is, the entire economic life of an existing or proposed asset must be considered.

For historical damages assessments, the analysis should be conducted beginning with the time of the initial occurrence of the alleged wrongdoing through the last period for which the claimant has been economically harmed. In instances in which a claimant has lost future economic opportunities, a discounted cash flow (DCF) analysis is required.[3]

Historical damages assessments can be performed with more certainty than future damages assessment if reliable historical data exist that covers the relevant time period, whereas future data must be derived via forecasting models and therefore typically include a forecast error. For example, forecasting lost profits due to the breach of a contract that specifies future prices and quantities will likely be more reliable than estimating future market prices and quantities in the absence of such specific contractual terms. In addition, estimating future lost profits for a claimant with an established performance record is often easier than estimating the same without an established performance record. The lack of a performance record or any type of comparator that can be used to inform forecasts exacerbates the issue of uncertainty, which increases with a longer time horizon.

There are cases in which estimating future economic damages may not be required even if future economic harm could be claimed. For example, a tribunal may determine an award for the claimant based on an estimate of historical damages from a breach of an ongoing long-term power purchase or other type of contract but deny any estimated future economic damage because the parties have an ongoing business relationship. In such a case, the tribunal can require the parties to adhere to its decision in their future behaviour and allow the parties to return before the tribunal if claims of future breaches occur. This approach to addressing future economic damages has been adopted in certain venues and types of cases within American jurisprudence.[4]

However, there are also instances where estimating future economic damages cannot be avoided, and it may be economically inappropriate not to do so. For example, a company forced into bankruptcy or temporarily or permanently excluded from a market that has no future potential revenue and profit streams requires some estimation of the future (eg, a premature dissolution of an oil fields joint venture or failed power plant generator). In these situations, however, questions typically arise with respect to the duration of the forecast period and the reliability of such forecasts because there are trade-offs between capturing the full value that was lost, mitigation possibilities and the accuracy of the forecasts.

An added complexity to determining the damages period is that revenues and costs can occur in lumpy increments, irregular sequences or different time horizons. Therefore, caution is required when selecting the modelling timeframe to avoid arbitrarily capturing only part of the economic impact. For example, large energy infrastructure projects, as well as telecommunications and other types of technology businesses, often incur large upfront costs associated with long lead-time investments for which they plan to receive lower, more regular revenue payments in the future once a product has been launched and throughout the operational phase. Using a short time horizon for the forecast in this circumstance could understate lost profits because it would capture many of the fixed costs but artificially limit the revenue contribution due to truncating the economic life of the asset.[5] Similarly, infrastructure assets often require lumpy replacement or refurbishment expenditures, such that if the analysis stopped just before a major capital expenditure it may overstate the lost profits.

2.3 Economic compensation for the time value of money

Consideration of the time value of money is relevant for economic damages analyses in two ways. First, it is used to calculate the economic harm associated with the difference in profit streams in the actual and but-for worlds in a multi-year future damages period, where the discount rate is used to convert future dollars into present-year dollars. Second, it is used to compensate claimants for the lag in time between the period when the harm occurred and when the judgment is awarded (pre-judgment interest).[6]

The discount rate adjusts for the time value of money, reflecting the fact that a dollar today is worth more than a dollar tomorrow. It also adjusts for the fact that a guaranteed dollar today is worth more than an uncertain dollar tomorrow. Therefore, the greater the risk associated with the profit stream, the higher the discount rate. The appropriate discount rate is case specific, but it typically involves a risk-adjusted cost of capital (ie, a rate higher than the risk-free rate or some other measure of the debt costs) because the cash flows the claimant would have earned in the but-for world are unlikely to be without risk. For example, consider a nuclear power plant that allegedly received a defective steam generator leading to the permanent shutdown of the plant, which caused past and future lost profits. A proper discount rate for the claimant in this matter captures the price and quantity risks in addition to other business risks and the time value of money, which is typically achieved by using a risk-adjusted discount rate, or weighted average cost of capital (WACC).[7] Using a non-risk-adjusted rate in this circumstance would artificially increase the value of the power plant by assuming the cash flows in the but-for world were less risky than they actually were. The damages calculation should not relieve the claimant of risks it would have faced in the but-for world.

Conversely, the pre-judgment interest serves to compensate the claimant for the lost opportunity cost of money.[8] A risk-adjusted WACC might be relied upon to quantify the pre-judgment interest component of economic harm to compensate for the lag between harm occurring and judgment awarded. This approach would reflect the opportunity cost of capital; that is, what the claimant might have done with that money, if it had it. With such funds, the claimant may have made a lucrative investment that earned a high return. However, all investments have downside risks, and the claimant may have chosen unwisely and lost its entire investment. Fisher and Romaine discuss the issues associated with only picking the winning side of an investment and the economic reality that although the claimant lost the upside of any potential investment, it was also relieved of the downside risk of any future investment it would have pursued. That is, not having the funds during the pre-judgement period, the claimant was deprived of the opportunity to invest, but it also was not exposed to the risk of those investments either.[9] As a result, tribunals and judges in commercial arbitrations frequently may decide to achieve a risk-neutral payout to compensate claimants for the lost opportunity investment, such as a risk-free US Treasury bill interest rate. However, debates exist and alternative approaches are proffered that consider country-specific factors, the cost of debt of the claimant (akin to a 'coerced loan') or other approaches.[10]

3. Maximising certainty using an accurate measurement of economic damages

It is well established and generally accepted that for a claim to be accepted, economic damages must be calculated with 'reasonable certainty'.[11] What does this mean in practice? First, absolute certainty is not required. As noted in the CPR protocol, 'If a tribunal determines that damages have been incurred, it should award them, even if they are difficult to establish with precision'.[12] Second, economic damages must not be speculative in nature, as the CPR protocol elaborates:

Most common-law systems require the award of damages reasonably calculated to make the claimant whole, but also caution that speculation by the decision-maker is impermissible. There is a difference, however, between damages that are difficult to determine and damages that are so imprecise as to give rise to doubt as to their existence – for example, as to whether the consequences of the respondent's actions were positive or negative for the claimant. Where assessing damages would require speculation, they should not be awarded.[13]

Between these two bookends, there is some ambiguity in the courts and arbitrations about what constitutes the required level of reasonable certainty.[14] For example, when describing American jurisprudence, Lloyd notes, 'while there is no single measure of reasonable certainty, we can nevertheless identify a number of discrete factors which courts consider when determining whether a claimant has proven its lost profits with reasonable certainty'.[15] Lloyd also acknowledges that the courts have not conclusively defined 'reasonable certainty'.[16]

Therefore, how does an economic expert deal with increasingly complicated industry and economic issues and still provide a level of 'reasonable certainty' to ensure that the tribunal knows reasonable certainty when it sees it. There is no shortcut to achieve this success. Rather, a detailed economic analysis is required of the full array of the industry and economic parameters that could be affected, as well as the interplay of all such parameters along with consideration of all the facts

and case-specific aspects. Only when this is complete can an economist assuredly conclude that the economic harm is reasonably certain.

4. Constructing the but-for world

As noted in the introduction, the but-for world is completely unknown because it did not happen. Therefore, out of necessity, it must be constructed. Creating the but-for world requires a detailed understanding of various moving parts in the economic market and the industry in question and the economic impact thereof. This is essential if an economist is to accurately understand and fully explain the array of economic consequences of any allegation of wrongdoing that may have caused economic harm to the claimant.

The economic parameters within the market and industry are dynamic and can shift in complicated and unexpected ways. Establishing a reliable but-for world requires disentangling the impact of other concurrent events that may also have affected the claimant. Accounting for concurrent events that may obfuscate the impact of the disputed behaviour is part of establishing economic and factual causation. Concurrent events or economic parameters may not always result in economic harm to the claimant, but rather could enrich its economic position. In such cases, an offset to the economic damages claim is required.

The following are stylised examples of real-world situations where actual economic and industry expertise is critical for constructing the economic parameters in the but-for world with the highest level of certainty.

4.1 Quantity factors (Q but-for)

Commercial arbitrations often involve breaches of supply agreements and claims that the failure or delay in supplying an input directly translates to fewer or even no sales and thus lost profits. Proper damages assessments must consider whether market conditions were such that the claimant could have actually fulfilled the sales in question. If not, it must be determined how many units the claimant could have sold in the but-for world.

For example, consider a cell phone manufacturer involved in a dispute with the manufacturer of a camera component it uses in its flagship device. Because the cell phone manufacturer is missing a critical component, it is unable to sell the flagship device. It argues that in the but-for world it would have made those sales. However, consider a situation where, just prior to the disruption, its key competitor launched a new flagship device with a superior camera. In this circumstance, the difference between the but-for and actual quantity is likely to be less than the difference implied by the supply disruption because the market conditions have changed from past levels, and the claimant's economic position would have necessarily changed as well.

This example involves a firm-specific reduction in demand, but market and economy-wide factors can affect the but-for quantity of the firm. One approach to address these issues is to econometrically forecast sales using historical information (or obtain the forecast of the company in question prior to the alleged harm), carefully taking potential changing market conditions into account (ie, controlling for other factors.)

4.2 Price factors (P but-for)

Calculating prices in the but-for world and establishing that they might be different from the prices in the actual world requires a proper analysis that considers market conditions and price trends and expectations prior to the alleged wrongdoing. This type of information may be available from the claimants, respondents or third-party market research.

If the claimant alleges the wrongdoing negatively impacted the price at which it sold its products or services, it must show this empirically. Consider again the smartphone manufacturer that misses supplies from its camera supplier and thus must delay the launch of its flagship model. The claimant alleges that this required it to discount its other smartphone models to minimise the loss of unit market share, thereby jeopardising its economies of scale and scope. It therefore argues that prices prior to the alleged wrongdoing are indicative of the prices in the but-for world. However, this is not an economically sound position if prices prior to the alleged wrongdoing were already declining. The claimant must separate the declining market prices from the additional decline, if any, caused by the price discounts in order to isolate the economic harm associated with the alleged wrongdoing.

4.3 Cost factors (C but-for)

Commercial arbitrations may involve construction-related claims associated with cost overruns, delays or malfunctions with the large energy, telecommunications and other infrastructure projects that are claimed to increase the cost claimants incurred to construct or operate the facility. For example, consider a solar manufacturing facility whereby the claimant alleges a breach of the engineering, procurement and construction contract resulting from a defective product. The defective product caused higher labour hours to operate the facility and resulted in a lower rate of production than contractually agreed. Similarly, a supplier of a

service (eg, a mining contractor or supplier of intermediate input) may claim that the purchaser's decision to shift the production schedule or require additional activities be performed may reduce operational efficiency, and therefore increase supplier costs. In both situations, C but-for would model the labour-related and operational costs associated with the contractually obligated performance levels, not the higher costs associated with the deficient level of performance observed in the actual world.

4.4 Interaction between quantity, price and cost factors

The variables in the model are also related to each other. For instance, Q but-for and P but-for are often connected such that if P but-for diverges from the actual world, Q but-for may also be impacted. Consider, for instance, a railroad that receives a US$5 per-use fee for its tracks and claims that the contractually agreed upon price is US$10 per use. In this case, with a substantially higher but-for price (ie, double the actual price), a proper analysis should evaluate any potential economic substitutes available. For example, the railroad may have other routes and/or other tracks it could rely on instead of absorbing the high-priced fee. In addition, for the remaining traffic that does not have a substitute route, the large increase in price may result in a lower level of shipments demanded. An economic study of price responsiveness (ie, price elasticity of demand) may be used to determine the appropriate Q but-for associated with P but-for (ie, unless the product is inelastic, a lower level of demand will be associated with the much higher fee). This simple example illustrates that quantities depend on price and vice versa, and the damages calculation must consider this interplay.

Numerous approaches can be used to estimate the impact of a breach of contract on the price/quantity relationship that would have existed but-for the alleged wrongdoing that caused the injury.[17] First, supply/demand models that simulate the supply curve and customer demand are commonly used in oil, gas and electricity market analyses to determine the but-for supply and demand conditions, as well as the market clearing prices. Second, econometric analyses may also be used to estimate the price effect.

An interplay between Q but-for and P but-for is also possible if the claimant can demonstrate that the alleged wrongdoing caused an increase in the market price above competitive levels that resulted directly from a supply reduction or increased costs. In such a circumstance, the claimant may have been deprived of economies of scale and scope that it would have enjoyed but-for the alleged wrongdoing. The C but-for examples and artificially reduced productivity touch upon this economic issue if the higher costs actually did lead to reduced production levels than would otherwise have been achieved with the agreed-upon performance requirements.

5. Properly evaluating the actual world

Even the actual world – which, unlike the but-for world, is observable – requires careful evaluation. It is inappropriate to assume without question that what actually happened is the only plausible outcome that could have happened. For instance, Q actual as well as P actual and C actual must consider the possible methods available to the claimant to economically mitigate the financial harm incurred. A mitigation analysis determines if the claimant took full advantage of the options available that might have reduced the economic harm, or if the claimant ignored them entirely. This evaluation should identify and assess all plausible actions that were taken or could have been taken by the claimant to reduce the economic damages. In addition, the economist must consider whether actions taken by others (eg, consumers) in response to the alleged harm might also have reduced the actual harm once properly acknowledged and taken into account.

The CPR protocol recognises the claimant's responsibility to mitigate damages as follows:

It is generally understood that damages may not be recovered to the extent that they could have been avoided or minimised through commercially reasonable conduct by the claimant with respect to the purpose of the contract.[18]

The net effect of mitigating damages may reduce the economic loss. In some cases, mitigating actions taken by the claimant may substantially eliminate the damages claimed.

To illustrate, consider the alleged breach of a supply contract where the claimant alleges it lost sales due to being unable to obtain a crucial input from a supplier for a period of time. It is common for manufacturers to have redundancy in their supply contract, thereby allowing them to source substitute or replacement supplies from other vendors. These types of mitigation are often available and documented for commodity supply disputes in industries such as oil, gas, power and coal. If the factual circumstances suggest the claimant could have reasonably substituted an alternative input, even if that option was not exercised, then the actual loss may be substantially reduced. If the alternative input is more expensive or the claimant has to incur costs to change suppliers, then this merely means the claim actually relates to increased costs, not lost sales.

Additional considerations would be required with respect to potential lost sales when companies rely on substantial inventories. Storage of a product provides an economic cushion to the company and may help smooth out delays or lumpy

timing of product deliveries. The possibility exists that no lost sales actually occurred if the inventory position (of the final good or the input) of the claimant could be used to bridge the shortfall caused by a breach in the supply contract.

A related issue can occur in any commodity sector, including power. Consider the situation where a natural gas-fired generator is unable to generate electricity because of an interrupted flow of natural gas in breach of its supply contract. A mitigating factor in this situation may be the purchase of additional gas supplies at a slightly higher price from an alternative gas supplier. Alternatively, if the claimant owns other power plants (ie, with excess supply) or can purchase power from other providers, the claimant may use these other power plants to generate additional replacement power.[19]

It is sometimes the case that substitution by customers to other products sold by the claimant will further reduce the economic harm. To illustrate, consider the example of a take-out chain that sells predominately salads to the lunch crowd. Assume it has supply contracts for its ingredients from various vendors and that, one day, the vendor for kale breaches its contract. On a typical day, the chain sells 100 bowls of kale salad. In addition to examining whether the chain could source kale from a different vendor, an accurate damages assessment considers whether all 100 bowls are lost sales or whether consumers substituted other salads offered by the chain (eg, spinach or lettuce) or other products altogether (eg, sandwiches). That is, one must measure the impact of the supply breach on profits as a whole instead of on the sale of kale salads alone. This type of analysis can be done through surveys studying consumer substitution patterns or through actual data, statistically testing whether the sale of spinach and lettuce salads increased relative to previous periods at other stores unaffected by the breach.

Similarly, consider once again the example of the cell phone manufacturer whose new flagship device is delayed because of breach of contract by its camera supplier. In response to this delay, instead of purchasing no phone or a competitor's phone, customers might purchase an existing model by the same manufacturer. That is, to the extent that the new device's sale would partly have been cannibalising existing sales, those sales are not 'lost' owing to the breach of contract. This can be assessed by examining the forecasted sales of the various models sold by the claimant and then looking at actual sales of the models in question to assess whether substitution occurred.

6. Conclusion

The high stakes and substantial complexity of the industries involved in today's commercial disputes require an industry and economic expert to ensure maximum certainty when measuring economic damages. Although the well-established standard of quantifying economic damages appears to be a straightforward exercise of calculating profits in the actual and but-for worlds, properly modelling these two worlds is far from a simple accounting exercise. Maximum certainty requires careful and detailed economic analyses, including the demonstration of economic and factual causation, disentangling the impact of concurrent events within the actual and but-for worlds, as well as an evaluation of potential mitigation, all while addressing the industry-specific competitive market dynamics of supply, demand and pricing and its regulatory constraints. As illustrated by the examples above, proper economic modelling should not be generalised. Each case will have individual facts and industry-specific issues with causation and mitigation that require uniquely tailored economic analyses, such that the economics of sandwiches, salads, electricity, electronics and railroads are likely to substantially differ.

[1]   The resulting economic harm arises from the lost opportunity of profit and may be referred to as expectancy or benefit of the bargain damages. We are not addressing other forms of economic damages, such as economic damages arising from reliance (also referred to as rescission), restitution or unjust enrichment that may apply in certain instances owing to contractual obligations or specific law/statute.

[2]   The claimant in a dispute is the party seeking reparations for the alleged wrongdoing and unjust economic harm. Generally, an economic damages analysis assumes the alleged wrongdoing is true when the liability phase of the dispute is adjudicated simultaneously with the damages phase rather than being bifurcated into two sequential phases.

[3]   For an overview of the DCF model and its use in international arbitration, see Jeff D Makholm, "The Discounted Cash Flow Method of Valuing Damages in Arbitration", in The Investment Treaty Arbitration Review – Edition 3, ed. Barton Legum (London: Law Business Research Ltd, 2018), 239–247.

[4]   For example, the US Federal Court of Claims required US utilities to regularly return to court to file updated economic damages claims associated with the United States' failure to comply with the standard contract for assuring the removal of spent nuclear fuel from US nuclear power plant sites.

[5]   The lost profits modelling approach of a shorter forecasted time horizon may also rely on a terminal value to capture the long-term profit stream.

[6]   In addition to pre-judgment interest, post-judgment interest may apply until the period for which the damages award is paid.

[7]   This article does not focus on the myriad types of debates about the selection of the WACC components.

[8]   Our focus remains on the economic circumstances when pre-judgment interest is not dictated by statute or law.

[9]   Franklin M Fisher and R Craig Romaine, "Janis Joplin's Yearbook and the Theory of Damages", Journal of Accounting, Auditing & Finance 5, No. 1/2 (Winter/Spring 1990): 145–157.

[10]   See, for example, Michael S Knoll and Jeffrey M Colon, "The Calculation of Prejudgment Interest" (Faculty Scholarship at Penn Law, Paper 114, 2005), http://scholarship.law.upenn.edu/faculty_scholarship/114; James M Patell, Roman L Weil and Mark A Wolfson, "Accumulating Damages in Litigation: The Roles of Uncertainty and Interest Rates", Journal of Legal Studies 11, No. 2 (June 1982): 341; Maribeth Coller, Glenn W Harrison and Melayne Morgan McInnes, "Evaluating the Tobacco Settlement Damage Awards: Too Much or Not Enough?" American Journal of Public Health 92, No. 6 (June 2002): 984–989.

[11]   See, eg, the article 7.4.3 (1), UNIDROIT Principles 2016; see also M Allen, R Hall and V Lazear, "Reference Guide on Estimation of Economic Damages", in Reference Manual on Scientific Evidence, 3rd ed (The National Academies Press, 2011).

[12]   CPR International Committee on Arbitration, "CPR Protocol on Determination of Damages in Arbitration", 2010, 2 (hereinafter CPR Protocol), https://www.cpradr.org/resource-center/protocols-guidelines/protocol-on-determination-of-damages-in-arbitration.

[13]   ibid.

[14]   See Neil Steinkamp, Elizabeth J Shampnoi and Robert Levine, "Understanding Reasonable Certainty In Int'l Arbitration", Law360 (19 May 2015), https://www.law360.com/articles/654068. The authors argue that the definition of reasonable certainty is ambiguous.

[15   Robert M Lloyd, "The Reasonable Certainty Requirement in Lost Profits Litigation: What It Really Means" (University of Tennessee Legal Studies Research Paper No. 128, November 2010, pp. 12–13).

[16]   ibid., p. 12.

[17]   For certain industries, such as electricity, where particular markets might have a steep supply curve along with a formalized market clearing price mechanism, a change in the bid/price of a marginal supplier (even with a small market share) may have a larger market impact.

[18]   CPR Protocol, 2.

[19]   For this example, potential differences in variable costs and bid prices (if operating in a market environment) along with additional market-related effects are ignored.

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