Journal of International Arbitration

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ISSN 0255-8106 Mode of citation: 33 J.Int.Arb. 1

Prejudgment Interest: An Economic Review of Alternative Approaches

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There is no consensus in the economic literature as to the appropriate measure of prejudgment interest to apply to damages. In this article, we review various proposed alternative methods for determining prejudgment interest rates: the claimant's ex post or hindsight cost of capital; the claimant's ex ante or opportunity cost of capital; the respondent's borrowing rate; and the risk-free interest rate. Upon examining each method's economic rationale and merits we conclude that where the objective is full compensation to the claimant the risk-free interest rate is the appropriate measure of prejudgment interest. Our examination of awards in international arbitration shows a prevalence of rates that are not associated with the claimant or the respondent, but rather are consistent with a risk-free rate approach or estimates of what arbitrators deem to be reasonable commercial rates.

1 INTRODUCTION

Any analysis of the appropriate rate of prejudgment interest must start with a review of what is the purpose behind awarding prejudgment interest. A commonly accepted purpose is to make the claimant whole as of the award date, i.e., to "compensate fully and precisely a plaintiff who has been wronged."[1] As important as the objective of prejudgment interest is the context in which that interest is awarded. Prejudgment interest is generally awarded at the same time as damages. At the time that prejudgment interest determinations are made, generally there is: no uncertainty about the amount of the award; no uncertainty about the timing of the award; and no uncertainty about the respondent's solvency.[2]

In many dispute settings, prejudgment interest rates are determined by statute, precedent, or past decisions. Because that is not always the case in international arbitration, we focus on prejudgment interest in this dispute resolution venue. This

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1 James M. Patell et al., *Accumulating Damages in Litigation: The Roles of Uncertainty and Interest Rates*, 11 J. Legal Stud. 341 (1982).

2 We address post-judgment interest rates further below, which relate to the remaining uncertainty about the timing of respondent's payment and future solvency.

Dolgoff, Aaron & Duarte-Silva, Tiago. 'Prejudgment Interest: An Economic Review of Alternative Approaches'. *Journal of International Arbitration* 33, no. 1 (2016): 99–114.

issue is often raised in international arbitration proceedings, and often addressed by damages experts.

In the following sections we discuss the pros and cons of four possible rates from which an arbitrator can select a prejudgment interest rate. In section 2, we analyze the claimant's *ex post* or hindsight-based cost of capital. In section 3 we cover the claimant's *ex ante* or opportunity cost of capital. In section 4, we examine the respondent's borrowing rate. Section 5 covers the risk-free interest rate. In section 6, we present data on prior decisions in international arbitration. We list points of agreement between the different approaches in section 7 and briefly discuss post-judgment interest in section 8. Section 9 concludes.

2 CLAIMANT'S *EX POST* OR HINDSIGHT RETURNS

Using *ex post* or hindsight-based returns as prejudgment interest intends to compensate the claimant for the returns on investments that it would have realized, by assuming they would have been the actual returns on the harmed investment or asset after the date of harm.[3] For example, suppose the respondent expropriated the claimant's asset in 2000, worth USD 50 million at the time. Between then and the award in 2005, the asset doubled in value to USD 100 million. This approach would award USD 50 million plus USD 50 million in prejudgment interest. In effect, it would award the value of the asset as of the time of the award. This approach essentially amounts to restitution of the specific lost investments, i.e., calls for *ex post* damages calculations. In other words, it consists of measuring the claimant's actual return on capital.

To its proponents, this approach presents two advantages. One, it is akin to a lost profits calculation, in that it is equivalent to moving the damages valuation date from the date of harm to the award date. In other words, the value of an asset at the award date is the same as the value of that asset of the date of harm adjusted for *ex post* changes in asset value between those dates. Two, for this reason, this approach is equivalent to calculating damages as of the award date, without any need for prejudgment interest.

However, that is usually not the task before the arbitrator. The arbitrator is tasked with finding the damages as of the date of the alleged harm, and then asked to move that amount forward to the award date.

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[3] A few decisions have favored this approach by choosing the date of judgment as the relevant valuation date. See, e.g., *Papamichalopoulos et al. v. Greece*, 330-B Eur. Ct. H.R. (ser. A) (1995), and *Brumarescu v. Romania*, 33 Eur. Ct. H.R. 862 (1999). This approach has also been favored under the possibility that the respondent does not restitute the claimant. See also John C. Keir & Robin C. Keir, *Opportunity Cost: A Measure of Prejudgment Interest*, 39 Bus. Law. 129 (1983).

3 CLAIMANT'S *EX ANTE* OR OPPORTUNITY COST OF CAPITAL

Other authors have argued[4] that claimants should be compensated for the inability to invest at the claimant's opportunity cost of capital.[5] Their rationale is that had the claimants been compensated as of the date of the harm, they would have invested that amount at their contemporaneous cost of capital. Stated differently, this argument assumes that the claimant should not have been made whole in cash compensation as of the date of harm, but instead never have been deprived of not only the value it had put at risk through investment in the business, but also the expected rate of return on that risk investment.

Following the previous example where the respondent expropriated the claimant's asset in 2000 (worth USD 50 million at the time), at the time of expropriation the claimant's opportunity cost of capital was 10%. Had the claimant received USD 50 million at the time of the award and realized a 10% annual return, it would have had USD 80.5 million by 2005. This approach would award USD 50 million plus USD 30.5 million in prejudgment interest.

This is reportedly the measure of prejudgment interest that is most often applied by ICSID tribunals, and support for it has been previously articulated as follows: "[T]he amount of compensation should reflect, at least in part, the additional sum that his money would have earned, had it, and the income generated by it, been reinvested each year at generally prevailing rates of interest."[6] For this reason, this approach is often called the "investment alternatives" approach.

It is useful to start a discussion of this measure with a definition of the company's cost of capital: a rate of return on investments that is sufficient to compensate investors for the risks they bear. The cost of capital is an *ex ante* rate, that is, it is an *expected* rate of return. The cost of capital is positively related to risk: riskier investments have a higher required return on investment, and correspondingly higher expected returns.[7]

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4 See, e.g., Manuel A. Abdala et al., *Invalid Round Trips in Setting Pre-Judgment Interest in International Arbitration*, 5 World Arb. & Mediation Rev. 1 (2011).

5 In practice, this is measured as the asset's cost of capital, which is alternatively described as its discount rate or weighted average cost of capital.

6 Inna Uchkunova & Oleg Temnikov, *A Procrustean Bed: Pre- and Post-Award Interest in ICSID Arbitration*, 29 ICSID Rev. 656 (Fall 2014), and *Compania del Desarrollo de Santa Elena SA v. Republic of Costa Rica*, ICSID Case No. ARB/96/1, Award, Feb. 17, 2000.

7 Note that this definition of the cost of capital indicates equivalence between a *required* rate of return and an *expected* rate of return. These are the same in arms-length transactions between investors and the company. If the *expected* rate of return were higher than the *required* return necessary to compensate for risk, investors would bid higher prices to earn that difference, and therefore decrease the *expected* return. If the *expected* rate of return were lower than the return necessary to compensate for risk, there will be less demand for the company's securities and the price will decrease, thereby increasing the *expected* return.

Because the opportunity cost of capital includes compensation for taking risk, it necessarily entails some degree of speculation proportional to the degree of risk. Actual returns will of course vary from *ex ante* expected returns, and the degree to which they might vary increases with the investment's risk and time horizon.[8] Such variance between expected and actual returns may result from, for example, cash flows or market interest rates varying from expected levels. Simply put, the value of a risky asset (including the value of all cash generated by that asset) need not – and typically will not – grow at the cost of capital established as of the date of harm.

The opportunity cost of capital is not appropriate compensation because it represents an *ex ante* expectation subject to considerable speculation about what returns would actually have been earned. While financial securities are structured such that required returns may be paid *ex ante* (e.g., through higher debt coupons or lower equity issuance prices), prejudgment interest is awarded *ex post*. Thus, there is an inconsistency introduced by applying *ex ante* cost of capital rates to an *ex post* calculation of compensation.

The opportunity cost of capital is also inappropriate because the claimant has not actually put any investments at risk to earn such a return. Instead, the respondent has allegedly deprived the claimant of being able to take that very risk, which could have turned out favorably but could have instead turned out unfavorably.[9]

Some proponents for the opportunity cost of capital approach argue that it results in an award that is consistent with the discounting of future cash flows used in determining the pre-interest award. However, this argument makes a false equivalence in projections of uncertain future cash flows and time-value adjustments to an awarded damage amount known with certainty.[10]

Even if one were to accept the claimant's opportunity cost of capital as the appropriate measure of prejudgment interest, several implementation issues would arise. For example, measuring it will be a point of contention. Perhaps due to issues like this, tribunals following this approach typically award interest at a rate equal to short-term U.S. Treasury Bills or U.S. six-month certificates of deposit, even in cases that did not involve U.S. companies or the US government.[11] This

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8 Over the time horizon there will be variances from period to period. Such variances should be treated on a compound basis.

9 Franklin M. Fisher & R. Craig Romaine, *Janis Joplin's Yearbook and the Theory of Damages*, 5 J. Acct., Auditing & Fin. 147–48 (1990).

10 This argument contends that it avoids "invalid round trips." See, e.g., Abdala et al., *supra* n. 4. A round trip refers to two time value adjustments spanning a particular valuation date (e.g., moving a future amount backward and a past cash amount forward to the same date). The notion of an "invalid round trip" rests on a wrong comparison between a risky asset (the amount brought backward from the future) and a risk-free asset (the amount brought forward from the past).

11 See Table 1, and Uchkunova & Temnikov, *supra* n. 6, at 656.

means that tribunals frequently award interest at a risk-free rate even when they adopt the "investment alternatives approach." Because this rate may be significantly lower than the rate at which the respondent borrows, it has been argued that it allows respondents to take advantage of exceedingly low interest rates and therefore the correct rate should instead be the respondent's borrowing rate.[12] We examine this alternative next.

4 RESPONDENT'S BORROWING RATE

Some argue that the prejudgment interest rate should be the respondent's borrowing rate, i.e., the rate on the respondent's traded debt securities or other measures of the respondent's cost to borrow.[13] As described by its proponents, a respondent's borrowing rate is the rate that would be demanded by an investor purchasing the claim at the time of harm: "the compensation claim has precisely the characteristics of a marketable debt instrument, and accumulation of damages at the defendant's debt rate is appropriate."[14] The rationale for this measure is that by denying the claimant its compensation at the date of harm, the respondent has forced the claimant to lend funds to the respondent until an award is paid. As a result, during and after the proceedings, the claimant faces default risk. Under this theory of a "coerced loan," the respondent must compensate for this default risk in order to make the claimant whole.

Following the previous example where the respondent expropriated the claimant's asset in 2000 (worth USD 50 million at the time), at the time of expropriation the respondent's borrowing rate was 8%. Had the claimant borrowed USD 50 million at the time of expropriation using its claim against the respondent as the loan's collateral, it would have paid interest corresponding to the respondent's credit risk. So, it would have paid 8% interest per year until the award date. This approach would award USD 50 million plus USD 23.5 million in prejudgment interest.

Proponents of the respondent's borrowing rate approach point out that, if the damage claim were to be sold to an investor at the date of harm, the price of that claim would be depressed by the default risk of holding the claim through dispute proceedings. But it does not follow why this should matter under a make-whole standard. If, hypothetically, at the time of harm the claimant would have been

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12 Irmgard Marboe, *Calculation of Compensation and Damages in International Investment Law* 3.267, at 6.127 (Oxford Univ. Press 2009).

13 See, e.g., Patell et al., *supra* n. 1; J.M. Colon & M.S. Knoll, *Prejudgment Interest in International Arbitration*, Transnat'l Dispute Mgmt. 6 (2007); *Teco Guatemala Holdings, LLC v. Republic of Guatemala*, ICSID Case No. ARB/10/23, Claimant's Memorial, Sep. 23, 2011; *Cargill Inc. v. United Mexican States*, ICSID Case No. ARB(AF)/05/2, Award, Sep. 18, 2009.

14 Patell et al., *supra* n. 1.

made immediately whole, then there would be no such default risk discount. Or suppose instead that, at the time of harm, the respondent placed into escrow an amount equal to the damage claim, which is to be released to the claimant only at the time of award conditional on a liability finding. Under this hypothetical, there is no dispute about damage amount, only liability. The escrowed funds will earn a cash rate of return, i.e., a risk-free rate such as obtained through investment in U.S. Treasury securities. At the time of award, the claimant is made whole at a rate of prejudgment interest lower than the respondent's borrowing rate.

Note that, under this hypothetical, the marketable claim standard still holds, for an investor buying the claim would not need to discount for default risk with an escrowed amount available should liability be proven. Of course, in real-world situations there is no escrow account, in part because there is a dispute not only about liability, but also about the damage amount itself. Thus, any default risk for a damage claim is inevitably part and parcel of the uncertainty of the claim's validity and the fact that the claim is disputed.[15] It is unclear why the claimant should recover interest that in part compensates for the uncertainty of the claim's validity. Certainly, at the time of the award, the arbitrators do not face such uncertainty and therefore should not take it into account.

One can see that the arbitrator's problem is *ex post* in nature by considering two opposite possibilities. If the respondent defaults on the award, the amount of interest charged is irrelevant because the claimant will not receive that compensation anyway. However, if the respondent pays the award, on an *ex post* basis there will have been no negative realization of the default risk.

A borrower's default risk is the chance that the borrower will not repay the borrowed amount. The realization of this uncertainty can either be favorable (borrower does not default) or unfavorable (borrower defaults). At the time a loan is made, it is impossible to know with certainty which outcome will occur. That is why lenders ask to be compensated for default risk up front (e.g., through higher interest charges/coupons). The lender receives some compensation as coupons are received,[16] so that losses are mitigated should a default occur.[17]

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[15] Indeed, it is clear that an actual transaction for a litigation claim at the date of harm would be valued at a fraction of expected award compensation given the uncertainties involved in dispute proceedings.

[16] If a borrower does not default the lender will have earned a return greater than a risk-free interest rate even though the borrower did not ultimately default (i.e., *ex post*). If a borrower does default, the lender will earn a lower return, possibly even negative. For this reason, lenders may pool default risks into portfolios such that *ex post* returns average out to a reasonable return for the average level of risk across borrowers.

[17] Alternatively, the lender can require compensation in the form of a discounted price on borrowings, i.e., a discount bond wherein the borrower repays more principal than was received at issuance. The value of a discount bond will be less than its face value (par value) at issuance. As time passes without default the value of a discount bond increases, so that at maturity the loan value is equal to its par value.

It is generally the case that at the time of an award there is no uncertainty about the amount of the award, the timing of the award, and, importantly, the respondent's solvency. Therefore, it is difficult to support the notion that using the respondent's borrowing rate compensates for risks when such risks no longer exist. During the proceedings, the respondent's solvency was indeed a risk that the claimant faced, but standing at the time of the award, that risk is in the past.[18] If the respondent is solvent as of the time of the award, the realization of that risk has been favorable. In fact, especially in the case of sovereign respondents, even a bond default does not imply that the respondent is unwilling or unable to pay an international arbitration award, which is a separate and distinct claim on the sovereign respondent apart from its bonds. Thus, the risk that the respondent will be insolvent during the proceedings is actually a risk associated with the dispute, not with the violation itself.[19]

4.1 Potential incentives to wrongdoing

A corollary to the "coerced loan" theory is the argument that prejudgment interest at rates below the respondent's borrowing rate provides the respondent with ill-gotten gains: "The minimum interest rate in international proceedings should . . . be the rate of government bonds of the respondent State."[20] Under this argument, a sovereign state pondering whether to expropriate an asset can choose either to (a) expropriate with full and prompt compensation; or (b) delay compensation until a later date by settlement or an arbitral damages award. If the state's borrowing rate is 15% but is assessed prejudgment interest at 5%, then the state effectively earns a 10% spread by deferring payment.[21]

This argument has several shortcomings. First, this fairness argument is unrelated to the "make whole" principle. While it is certainly possible that the respondent may earn a return by deferring compensation to the claimant, that has no impact on any assessment of the claimant's losses. So, the argument to assess prejudgment interest at borrower's rate, therefore, may rest in part on fairness grounds. However, this fairness argument is unrelated to a full compensation standard of damages.

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[18] It is a basic principle of valuation that sunk costs are irrelevant in determining the value of an asset. Likewise, "sunk" default risk is irrelevant to determining the present value of a claim against a borrower.

[19] Fisher & Romaine, *supra* n. 9, at 148.

[20] Marboe, *supra* n. 12, at 6.295.

[21] We assume for simplicity that, at the time of the expropriation the amount required for full compensation is known. In practice, of course, the parties may dispute the amount even if they otherwise agree that some form of compensation is due.

Second, the notion that the respondent earns the difference between its borrowing rate (e.g., 15%) and the rate of prejudgment interest (e.g., 5%) is flawed. To see why, note that it is the funding cost of the misappropriated asset that matters in this situation, not the respondent's average borrowing rate. This argument that the respondent earns a spread wrongly assumes that the funding cost of the misappropriated asset is equal to the respondent's average borrowing rate, but the two need not be at all related. For example, the misappropriated asset may be very low risk, in which case the cost to the respondent to finance it would be lower than the respondent's average borrowing rate. Indeed, to the extent that the addition of the misappropriated asset to the respondents' overall assets alters the respondent's creditworthiness, the misappropriation would alter the respondent's average borrowing costs.

Third, where damages are assessed as of the date of harm by the asset's fair market value, the fairness argument runs into an inconsistency. The value of the asset to the respondent need not be the same as the value of the asset to the claimant.[22] Thus, any notion of an ill-gotten gain cannot be ascertained by reference solely to the differential between the rate of prejudgment interest and respondent's borrowing rate. So, the respondent's ill-gotten gains (or losses) are not solely attributable to the interest charged on the ill-gotten asset, but also the valuation of the asset itself.

5 RISK-FREE INTEREST RATE

The risk-free interest rate compensates only for the time value of money. The rationales for the risk-free interest rate were presented in the previous sections, by contrasting it with the alternatives, but the arguments for its use as prejudgment interest rate are essentially the following. At the time of harm, the claimant has been deprived of something of value. This also deprives the claimant of any risks associated with that value. For example, if the claimant has been deprived of the net present value of an investment project with payoffs sometime after the date of harm, then the claimant has also been deprived of any variability of those payoffs due to the investment activity's inherent risk.

Following the previous example where the respondent expropriated the claimant's asset in 2000 (worth USD 50 million at the time), the future value of the asset by the time of the award could predictably be USD 0 or USD 100

[22] For example, claimant might be denied an asset without any corresponding gain to respondent (e.g., alleged improper regulatory permitting delays). A respondent might value an asset more (or less) than claimant would value the same asset if the parties face different risks and opportunities related to the asset. Such party-specific valuations might not meet the requirements of the fair market value standard used for damages awards under a full compensation standard.

million. By expropriating the asset, the respondent bore the risk that the value could increase or decrease. The claimant did not bear any business risk related to the value of the asset. The claimant was free of any variability associated with the asset's inherent risk, as long as the damages are calculated as of the expropriation date. Therefore, the claimant should be awarded prejudgment interest commensurate with that absence of risk, i.e., a risk-free rate such as the yield on US Treasury Bills. If this rate was 2%, then this approach would award USD 50 million plus USD 5.2 million in prejudgment interest.

6 PAST DECISIONS

Table 1 provides a summary of the prejudgment interest rates awarded in various international arbitrations, along with excerpts of rationales provided by various tribunals.[23] Omitted from this table are cases in which prejudgment interest was determined based primarily on legal rationales.[24]

One salient aspect of these decisions is the near complete absence of any rates based on the claimant's or the respondent's perspectives. The only exception (*Tidewater v. Venezuela*, 2015) argues against using the respondent's borrowing rate, choosing instead a proxy for the claimant's borrowing rate, which is essentially the claimant's opportunity cost of capital as if it was fully financed through debt. But, most importantly, there is a prevalence of decisions favoring a risk-free or similar rate.

One interesting aspect of these decisions is the differing interpretation of the phrase "reasonable [or normal] commercial rate," a phrase typically rooted in the applicable investment treaty. Some opinions interpret "reasonable commercial rate" to reflect an investment rate of return, i.e., the return that the claimant could have earned had it invested the award as of the date of harm. This first interpretation often leads to selection of a near risk-free rate (e.g., *BG Group v. Argentina*'s award of a "highly secure . . . liquid and short-term instrument"). The second interpretation of "commercial rate" is for a cost of borrowing, typically measured as a rate higher than an interbank borrowing rate such as LIBOR (e.g., *Tidewater v. Venezuela*), given that banks would generally charge higher rates to loan funds than to borrow them. This second interpretation may be rooted in claimants' arguments that their harm forced them to borrow funds. Such an argument is not far removed from arguments above for the claimant's cost of capital (where the

[23] This list is not intended to be comprehensive, but rather indicative based on a random selection of publicly available award decisions.

[24] For example, based on national laws or contractual terms. Examples include *CME Czech Republic B.V. v. Czech Republic*, UNCITRAL, Final Award, Mar. 14, 2003; *Southern Pacific Properties (Middle East) Ltd. v. Arab Rep. of Egypt*, 3 ICSID (W. Bank) 189, 248, Award, May 20, 1992.

borrowing rate is just one component of that cost), but is also complicated by the fact that any post-harm borrowing may reflect litigation risk or risks related to the claimant's business outside the alleged harmed asset.

The first interpretation as an investment alternative is more supportable than the second as a commercial borrowing rate, because any investor has the ability to purchase a given type of investment and because the commercial borrowing rate interpretation entails a degree of subjectivity, given that rates for commercial borrowers vary significantly based on both borrower-specific and loan-specific risks.[25]

Table 1 Prejudgment Interest Rates Awarded in Selected International Arbitrations

Case	*Prejudgment Interest Award*	*Rationale*
BG Group v. Argentina (2007)	U.S. Treasury six-month certificates of deposit, with semi-annual compounding[(a)]	"a reasonable commercial rate . . . the instrument in which BG could have reasonably invested funds available to it . . . a highly secure, dollar denominated, liquid and short-term instrument would have enabled BG to rapidly redeploy its funds"
Siemens v. Argentina (2007)	Average rate for U.S. six-month certificates of deposit, with annual compounding	"the guiding principle is to ensure 'full reparation for the injury suffered as a result of the internationally wrongful act.' The Tribunal considers that the rate of interest to be taken into account is not the rate associated with corporate borrowing but the interest rate the amount of compensation would have earned had it been paid after the expropriation"

[25] Even the same borrower may pay several different borrowing rates depending on the relative seniority and security of each of the borrowings.

Case	*Prejudgment Interest Award*	*Rationale*
ADM & Tate & Lyle v. United Mexican States (2007)	Monthly U.S. Treasury bills, without compounding	"Compensation should include interest at a commercially reasonable rate ... since this is not an expropriations case, but rather concerns the appropriate compensation . . . as a result of the Respondent's breach of the national treatment and performance requirements under [NAFTA] Chapter Eleven, the Tribunal's view is that simple interest is appropriate"
LG&E v. Argentina (2007)	Six-month U.S. Treasury bills, with compounding	"The Tribunal disallows the Claimants' expert proposal to use Argentina's borrowing rate as speculative and extemporaneous. The Tribunal notes further that Argentina has supported the use of a pre-judgement interest rate based on short-term US Treasury bills"
Mobil v. Venezuela (2014)	U.S. Prime rate, with annual compounding	"Article 6 of the BIT requires that compensation to be paid in case of expropriation 'include interest at a normal commercial rate.' Accordingly, the Tribunal rejects the Claimant's request to apply the rate reflected by the yield of the Respondent's sovereign debt. Considering the circumstances of the case, the parties involved and the fact that the compensation is to be awarded in United States dollars, the Tribunal considers that the current US prime rate of 3.25% is the appropriate rate for the whole period"

Case	*Prejudgment Interest Award*	*Rationale*
Flughafen v. Venezuela (2014)	One-year LIBOR + 4%, with annual compounding	"The compensation due from 2005 should be associated to an interest rate which compensates a long-term debt . . . the credit risk of the US is the lowest in the market, which involves the application of unreasonably low rates . . . The Tribunal should apply a rate that compensates the external financing costs of the Claimants as a result of the temporary unavailability of the compensation to which they were entitled. The LIBOR rate . . . is a universally accepted reference for setting interest rates for loans, deposits and other financial instruments. In financial practice, bank loans to customers accrue an interbank LIBOR rate plus a surcharge . . . The Tribunal estimates that a LIBOR rate for USD for one-year deposits plus 4% is a reasonable rate and ensures full reparation when compensating the Claimants . . . The economic rationale behind the interest is to cover the external financial cost that the Claimants would have incurred for the unavailability of the compensation to which they were entitled for expropriation"

Case	*Prejudgment Interest Award*	*Rationale*
Chevron and Texaco v. Ecuador (2010)	U.S. Prime rate, with annual compounding	"The guiding principle in the determination of pre-award interest is that what should be charged is not the amount of the Respondent's enrichment as a result of its non-payment, nor the actual cost incurred by the Claimant as a result of non-payment, but rather the lost investment income the Claimants otherwise could have realized had the claim been paid in a timely manner. The Tribunal is thus persuaded that Ecuador's sovereign cost of debt includes compensation for certain investment risks that were not and are not being taken by the Claimants on the sum of any award. Similarly, the Respondent's argument that the Claimants' cost of debt should be used is also rejected, as it does not reflect the return that could have been achieved through a normal risk-free investment vehicle"

Case	*Prejudgment Interest Award*	*Rationale*
Tidewater v. Venezuela (2015)	4.5%, with quarterly compounding[(b)]	"Article 5 of the BIT, which the Tribunal has found to be applicable to its determination of compensation generally, mandates the payment of interest 'at a normal commercial rate until the date of payment.'… In the Tribunal's view, [the Respondent's sovereign bond] approach mistakes the reason why pre-award interest is commonly included in a calculation of compensation in a case such as the present. Interest in such a case simply aims to compensate the claimant from being kept out of its money between the date on which it ought to have been compensated and the date of payment of an enforceable award. Such compensation is not punitive of the Respondent. Rather, as the Treaty's reference to 'normal commercial rate' underlines, it represents the cost of borrowing the sum that the claimant ought to have received over the same period of time. Thus, the appropriate reference point is the cost of borrowing available to Claimants, not the amount that Respondent would have had to pay"
Wena Hotels v. Egypt (2000)	9%, with quarterly compounding	No rationale given. Claimant did not put forth any pre-judgment interest proposal. Respondent's expert noted that Egypt's long-term government bonds yielded 10%

(a) It is unclear if the Tribunal intended to award based on U.S. Treasury bills; certificates of deposit are offered by banks rather than by the U.S. Treasury.
(b) The Tribunal chose 4.5% after considering claimant's calculation of a rate of 1.43% based on three-month U.S. Treasury bonds + 1.33% and respondent's calculation of 5.2% based on either U.S. prime + 2% or LIBOR + 4%.

7 IMPLEMENTATION AND POINTS OF AGREEMENT

While our review has focused on general approaches to prejudgment interest, we note that even within a given approach implementation choices may contribute to points of contention. For example, the selection of specific interest rate benchmarks can materially impact the prejudgment interest amount. As an illustration, under the respondent's borrowing rate approach a respondent may have multiple types of debts outstanding, paying different interest rates according to their risk characteristics. Likewise, selection of a term maturity, compounding frequency, or risk premium adjustments (if any) can affect the determination of a prejudgment interest rate. Such choices may require expert opinions, influenced by the expert's determination of prejudgment interest rate approach, how to apply it, and the quality of data available to implement that approach.

Notwithstanding points of contention with the prior literature, there are three areas in this debate where economists would generally agree with each other. First, interest should be calculated with compounding, that is, interest should reflect the reinvestment of interest at regular intervals over time. Simple interest does not compensate for the passage of time as it leads to an effective rate that is lower than the nominal interest rate used. Since markets set interest rates assuming compounding, the use of market rates with a simple interest calculation is inconsistent. So, at a minimum, it would not make sense to apply simple interest calculations to market interest rates that are premised on compounding.

Second, the interest rate should be measured using instruments that are in the same currency denomination as the award. Because interest rates reflect currency-specific expected rates of inflation, it is inappropriate to apply interest rates from one currency toward award amounts in another currency. Whenever appropriate award-currency interest rates are not available, it may be possible to convert interest rates from one currency to another.

Third, interest rates should be measured in nominal terms, that is, without adjustment for expected (or actual) inflation. While there may be a theoretical economic argument that making the claimant whole requires maintaining purchasing power of any value lost, such arguments fail to conform to commonly-understood notions of "making whole" measured nominally. Moreover, it may be difficult to determine what rate of inflation is appropriate to maintain purchasing power, given the multitude of measures of inflation available.[26] In well-functioning capital markets, nominal interest rates will adjust to reflect expected inflation rates. While any given interest rate may reflect expected

[26] In the United States, for example, there may be significant differences in measured inflation between "headline" CPI, core CPI (excludes food and energy), and PCE measures. Such differences may be large when cumulated over a lengthy prejudgment interest time period.

inflation that over- or under-estimates actual inflation, over time such errors will tend to cancel out, particularly when compounding interest using short-term rates.[27]

8 POST-JUDGMENT INTEREST

Our discussion has focused on the rate of prejudgment interest, i.e., interest assessed from the date of harm to the date of award. Much of our discussion does not extend to post-judgment rates. While there may be arguments in favor of higher rates to motivate the defaulting party to pay promptly, such motivations entail subjective decisions by the arbitrators and are not deeply informed by economic principles.

Once an award is final, it can become a marketable asset in its own right, devoid of any litigation risk. In this setting, default risk remains. As long as an appropriate measure of default risk can be discerned for the award payment itself (as distinct from risks that the claimant might default on other unrelated obligations), then the respondent's borrowing rate might be appropriate for assessing post-judgment interest. At such a rate, the claimant would be able to sell the award at face value (i.e., the equivalent of par value for a bond or loan).

In contrast, if the post-judgment rate is higher (lower) than the respondent's borrowing rate associated with the award, then the claimant would be able to sell the award at more (less) than face value, thereby being overcompensated (undercompensated) relative to the make-whole standard.

9 CONCLUSION

We have presented different approaches to establishing prejudgment interest and described various economic arguments related to each approach. We have also shown that, in prior decisions, arbitrators have tended to follow measures deemed to be reasonable "commercial rates" or measures that are closer to risk-free interest rates. Notably, the chosen measures have tended to sidestep either party's particular circumstances or costs of capital. However, absent clear guidelines or greater unanimity in arbitral award decisions, this debate is likely to continue. This article serves to better inform this debate, providing economic rationale in selecting among alternative measures of prejudgment interest, and highlighting important issues that may need to be addressed in implementation of the various alternative measures.

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[27] While long-term rates might update frequently to reflect changing inflation conditions, analysts may sample long-term rates on a less frequent basis, leading to potential gaps between actual and expected inflation.