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**LONG-TERM RISK-FREE RATES
AND THEIR USE IN COST OF CAPITAL CALCULATIONS**

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I. Scope of Work and Experience

1. Navigant Consulting, Inc. ("Navigant") has been asked by Frank Advokatbyrå ("Counsel"), to prepare this report to address the role of the "risk-free" rate of interest as a primary component of the cost of capital calculation used for the revenue regulation of gas and electricity networks in Sweden. We have been asked to consider the consistency of the long-term investment horizon of the gas and electricity sectors, forty years or more, and the appropriate duration of the risk-free rate applied in this context. We have also been asked to consider, in the same context, what an appropriate equity risk premium ("ERP") would be for these investments.
2. I, Garrett W. Rush, am a Managing Director in the Washington, DC office of Navigant Consulting, Inc. in its International Arbitration practice. I have been conducting financial and economic analysis since 1995 including analysis of cost of capital for regulated industries in Europe and South America and gas networks in the U.S. and New Zealand. I hold the designation of Chartered Financial Analyst, having received this designation in 2001. I received a Master of Business Administration from INSEAD in Fontainebleau, France in 2004. My curriculum vitae is provided in Appendix 1 to this report.
3. I, Brent C. Kaczmarek, am a Managing Director in the Washington, DC office of Navigant Consulting, Inc. I lead Navigant Consulting's International Arbitration practice. My work has included the calculation of cost of capital for regulated industries in Europe and South America. I have also testified in cases involving gas companies and networks in Africa, Europe, South America, and New Zealand. I hold the designation of Chartered Financial Analyst, having received this designation in 1998. My curriculum vitae is provided in Appendix 1 to this report.
4. This report is divided into six additional sections. Section II is a summary of our findings. Section III introduces the fundamental concepts, such as the cost of capital, that form the basis of this report. Section IV describes the theory behind choosing a risk-free rate, including explaining the relationship between bond yields and bond maturities and the reasons for differences in yield amongst bonds of different maturities. Section V discusses government bond yields in terms of the Swedish market and other comparable bond markets, such as the U.S. and German markets. Section VI reviews the conditions under which it is appropriate to apply a normalized risk-free rate. Finally, Section VII explains the interrelationship between the risk-free rate and equity risk premium and the effect that a long-term risk-free rate would have on the latter.

II. Summary

5. Cost of capital is the central element of investment analysis—a gauge of expected returns that are ultimately used to determine value. The risk-free rate forms the foundation of the cost of capital calculation. The risk-free rate is equal to the yield on developed countries' government-issued long-term securities. U.S. 20-year and 30-year government bonds are considered a standard proxy for the risk-free rate. The key characteristics of these securities that make them ideal proxies for the risk-free rate include the following: (1) they are issued by the governing body of the largest economy in the world in the worldwide reserve currency, (2) they are longer term, thus avoiding the risk of incorporating short-term interest and inflation volatility, and (3) they are traded on a liquid market, such that their prices and yields represent a readily observable market-based measure.
6. There are two issues we consider with respect to estimating a risk-free rate for calculating the appropriate cost of capital for gas and electricity networks in Sweden. First, we consider whether the market for the Swedish 20- and 30-year government bonds is liquid and can form the basis for a risk-free rate. In our analysis, we observed that the bid-ask spreads on Swedish bonds—a common measure of bond liquidity—indicate sufficient liquidity, especially for the 30-year bond. Also, when we compared the maturity spreads in the U.S. and Germany with those in Sweden, we found that the actual spreads in Sweden were not significantly different from those implied by the other markets. These spreads demonstrate additional yields over the 10-year Swedish bonds of between 0.5 and 0.9 percent for the 20 and 30-year bonds. Based on this, our view is that the Swedish 20- and 30-year bonds are sufficiently liquid. Even if the Swedish bond market were not considered sufficiently liquid, one could use the maturity spreads of comparable markets as a proxy for the Swedish market, with a similar result.
7. Second, it is critical to consider the effect of current economic conditions on risk-free rates and how this could affect our estimates of a risk-free rate over a 40-year horizon. Since the start of the financial crisis in 2008, valuation experts have advised that the use of current government bond yields as a basis for a risk-free rate understates the long-term rate because recent rates reflect short-term government policies, such as the quantitative easing program in the U.S., rather than long-term fundamentals. For example, McKinsey & Company recommends the following approach:

“To overcome the inconsistency between interest rates on government bonds and market values of equities, we recommend using a synthetic risk-free rate. To build a synthetic rate, add the expected inflation rate of 2.5 percent to the **long-run average real interest rate of 2 percent**,

which leads to a synthetic risk-free rate of 4.5 percent. Although it is different from the actual yield, the synthetic yield is based on our judgment that the low interest rates are an aberration caused by the unusual monetary policy and a flight to safety.”

8. Other valuation experts recommend a similar approach with similar results. For example, Pratt and Grabowski provide an example of using a nominal risk-free rate of 4.5 percent as a “normalized risk-free rate of return” in December 2008, at a time when the financial crisis started affecting actual rates.
9. The estimation of the risk-free rate also impacts the estimation of the equity risk premium (“ERP”) – the premium *above* the risk-free rate that investors require for taking the increased risk associated with equity investments. The most widely used approach for estimating the ERP is to use long-term historical equity and risk-free returns in stable mature markets. We estimate an equity risk premium of 5.5 percent. This is based on a range of estimates, using different methodologies, time periods, markets, and approaches. The following table summarizes some of those estimates:

Table 1 – Summary of ERPs

Source	Historical ERP	Time Period	Market	Method/Notes
Damodaran	6.3%	1928-2014	U.S.	Arithmetic average of historical returns
Duff & Phelps	5.5%	Forward-looking	U.S.	Based on current economic conditions
Dimson, et al.	7.1%	1900-2001	Sweden	Arithmetic average of historical returns
Dimson, et al.	5.4%	1900-2001	Global	Arithmetic average of historical returns

10. Overall, a risk-free rate in the 4 to 5 percent range, based on a “normalized rate”, and an ERP of 5.5 percent implies an expected post-tax overall market return in the range of 9.5 to 10.5 percent in nominal terms and approximately 7.5 to 8.5 percent in real terms.

III. Cost of Capital Background

11. In financial economics, the weighted average cost of capital (“WACC”) is commonly used to estimate the opportunity cost that investors face when choosing to invest their funds in one investment over another equally risky investment. The WACC is synonymous with expected return, required return, or a firm’s hurdle rate.
12. In practice, calculating a WACC involves weighting the cost of debt and cost of equity according to the relative share of debt and equity that comprises the firm’s target capital structure. In order to estimate the cost of equity, the most common approach is to use the Capital Asset Pricing Model

("CAPM"), which is a function of the risk-free rate, the ERP, and the company-specific beta. The risk-free rate represents the return due to investors based on the simple time value of money, whereas the ERP represents the return *above* the risk-free rate that investors require for taking the increased risk associated with equity securities rather than risk-free AAA government bonds. Finally, beta scales the ERP for the risk related to the subject investment and industry. In Figure 1 below, we show the CAPM formula:

Figure 1 – CAPM Formula

$$\text{CAPM} = R_f + \beta * (R_m - R_f)$$

Where:
 R_f = Risk Free Rate of Return
 β = Beta
 R_m = Expected Market Return
 $R_m - R_f$ = Market Risk Premium = MRP

13. In this report, we focus on the role of the risk-free rate in the CAPM, which impacts both the risk-free rate assumption and the calculation of the ERP.

IV. Theory on Risk-Free Rates

14. In this section, we first discuss the essential tenets associated with choosing an appropriate risk-free rate. Second, we explain bond pricing theory, particularly as it relates to sovereign bonds, which are typically used in the calculation of a risk-free rate. Finally, we discuss the relationship between risk and return in the context of short- and long-term government bonds.

A. Fundamentals of Risk-Free Rates

15. Many risk and return models, the CAPM included, begin with the expected return on a risk-free asset. The expected return on a risky investment is measured with respect to the additional risk that an investor must assume above the risk-free rate. The following is a commonly accepted definition of "risk-free":

"Investors who buy assets have a return that they expect to make over the time horizon that they will hold the asset. The actual returns that they make over this holding period may be very different from the expected returns, and this is where the risk comes in. Risk in finance is viewed in

terms of the variance in actual returns around the expected return. For an investment to be risk free in this environment, then, the actual returns should always be equal to the expected return.”¹

16. Professor Aswath Damodaran of the NYU Stern School of Business and a preeminent authority on valuation defines two requisite characteristics for an asset to be considered risk-free. First, the asset must be free of the risk of default, which in practice, eliminates the possibility of using securities issued by private firms.² Accordingly, risk-free rates are based on the yields of government-issued securities (usually measured as the yield on U.S. government bonds or other AAA-rated sovereign bonds).³
17. Second, the asset should also be free of reinvestment risk; in other words, the asset’s returns should not be based on reinvestments that occur at unknown rates.⁴ For instance, a 5-year U.S. Treasury bond is not entirely risk-free as it is not possible to predict the rates at which the coupons will be reinvested. Under this scenario, the proper risk-free rate for a five-year time horizon is the return on a 5-year *zero coupon* government bond. In the most technical sense, therefore, *each* cash flow should be discounted based on a risk-free rate derived from a zero coupon government bond with the same maturity.⁵ In practice, however, this is not always possible, particularly when cash flows for periods of ten, twenty, or even forty years out, must be discounted. Valuation practitioners and economic theorists thus advise the use of a “duration matching strategy”, whereby the practitioner chooses a single government bond with a duration that best matches the duration of the entire cash flow stream.⁶
18. As a result of the discussion above, when discounting the cash flows associated with a long-term investment, the risk-free rate ought to be the yield on a long-term government bond.⁷

¹ Aswath Damodaran, *Estimating Risk Free Rates*, p. 3, Emphasis added.

² Aswath Damodaran, *Estimating Risk Free Rates*, p. 4.

³ Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 5th ed. (New Jersey: John Wiley & Sons, Inc., 2010), p. 236.

⁴ Aswath Damodaran, *Estimating Risk Free Rates*, p. 5.

⁵ Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 5th ed. (New Jersey: John Wiley & Sons, Inc., 2010), p. 237.

⁶ Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 5th ed. (New Jersey: John Wiley & Sons, Inc., 2010), p. 237; Aswath Damodaran, *Estimating Risk Free Rates*, p. 5.

⁷ Aswath Damodaran, *Estimating Risk Free Rates*, p. 6.

B. *Fundamentals of Bond Pricing Theory*

19. Having established that the appropriate asset on which to base the risk-free rate is a government bond with a duration comparable to the duration of the cash flow stream, we now summarize the concepts behind government bond pricing, bond yields, and the economic conditions that influence the two.
20. The price of a bond is equal to the present value of its expected cash flows.⁸ Normally, a bond's cash flows consist of (1) periodic coupon interest payments and (2) the bond's face value (also referred to as the "par value" or "maturity value"), which is repaid at the maturity date. The interest rate that an investor requires from investing in a bond is called the "yield". The yield that investors require is essentially determined by comparing the yields offered on comparable bonds in the market (*i.e.*, of the same credit quality and maturity).⁹ The rate used to calculate the present value of all cash flows is the "yield to maturity", which in plain terms, is the return an investor would realize on a bond, given a particular price, if the bond is held until maturity. The risk-free rate is calculated as the yield to maturity. As the actual amount of the coupon payments do not change, a bond's market price will change such that its yield to maturity varies according to market conditions.
21. For risk-free government bonds, there are two key macroeconomic forces that govern bond pricing: the general level of interest rates and inflation, which are intricately linked. If interest rates in the economy rise or fall, the price of a bond will commensurately decrease or increase. Inflation expectations also affect bond prices, as they indirectly influence nominal interest rates.¹⁰

C. *Yield to Maturity and Term Structure*

22. The term structure of interest rates concerns the relationship between bond yield and maturity. The graphical representation of the varying yields on bonds of equal credit quality but different maturity is known as the yield curve. The yield curve provides critical insight into the reasons behind the variance in yields between long- and short-term government bonds. In this section, we discuss the possible relationships between yield and maturity, which manifest as differently shaped yield curves, and the factors that determine yield curve shape.

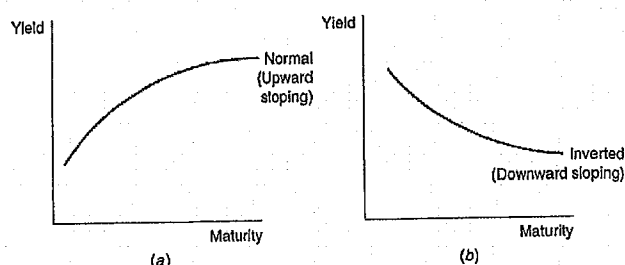
⁸ Frank J. Fabozzi and T. Dossa Fabozzi, eds., *The Handbook of Fixed Income Securities*, 4th ed. (Chicago: Irwin Professional Publishing, 1995), p. 49.

⁹ Frank J. Fabozzi and T. Dossa Fabozzi, eds., *The Handbook of Fixed Income Securities*, 4th ed. (Chicago: Irwin Professional Publishing, 1995), p. 51.

¹⁰ Per the Fisher Equation. See Richard A. Brealey, Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance*, 9th ed. (New York: McGraw Hill, 2008), pp. 75-76.

23. In Figure 2 below, we show two hypothetical yield curves describing the possible relationships between interest rates (yield) and bond maturity. The “typical” or “normal” relationship is upward-sloping, such that long-term interest rates are higher than short-term rates.¹¹ This is, by far, the dominant term structure of interest rates observed in liquid bond markets.¹²

Figure 2 – Hypothetical Yield Curves



24. As illustrated by Figure 2 above, a yield curve may also be inverted (downward sloping).¹³

Academics and practitioners alike have long observed that inverted yield curves often occur prior to recessions.¹⁴ In the case of an inverted yield curve, short-term interest rates are higher than long-term interest rates, reflecting a collective belief that short-term interest rates will decline in the near future. Investors are therefore willing to hold onto long-term bonds, despite their lower yield, in order to lock in the rate for a longer period.

25. There are two key principles used to explain the relationship between bond maturity and yield. The first is known as the expectations theory.¹⁵ A straightforward interpretation of this theory suggests that the term structure of interest rates is determined by the market’s current expectations of future

¹¹ Frank J. Fabozzi and T. Dossa Fabozzi, eds., *The Handbook of Fixed Income Securities*, 4th ed. (Chicago: Irwin Professional Publishing, 1995), pp. 131-132.

¹² “Given that the yield curve in the United States has been upward sloping for most of the last eight decades, the risk premium is larger when estimated relative to short term government securities (such as treasury bills) than when estimated against treasury bonds.” Damodaran, Aswath, “Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition”, Updated: March 2015, p. 31.

¹³ Yield curves may also be humped or flat. In the case of a flat yield curve, the yields on short- and long-term bonds are nearly identical. In this case, investors generally hold mixed expectations as to future interest rates and inflation. If recession seems imminent, investors may purchase long-term bonds in order to capture the higher yields; as a result, the price of long-term bonds goes up, and the yield goes down, leading to a flatter curve. A yield curve may be humped, in which case the yield on medium-term bonds is higher than that of short- and long-term bonds.

¹⁴ Andrew Ang, Monika Piazzesi, and Min Wei, “What Does the Yield Curve Tell Us About GDP Growth?” National Bureau of Economic Research Working Paper Series, No. 10672, August 2004, p. 5.

¹⁵ Frank J. Fabozzi and T. Dossa Fabozzi, eds., *The Handbook of Fixed Income Securities*, 4th ed. (Chicago: Irwin Professional Publishing, 1995), p. 132.

short-term interest rates. An expectation that short-term interest rates will rise would tend to (1) increase demand for short-term bonds, thereby increasing the price and lowering the yield, and (2) decrease demand for long-term bonds, thereby decreasing the price and increasing the yield.¹⁶ The second key component of explaining the term structure of interest rates is risk. Long-term bonds exhibit greater price volatility than do short-term bonds for a given change in market interest rates. The extra risk associated with the greater volatility of long-term bonds implies that investors will only hold such bonds if they offer a higher level of return. Similarly, long-term bonds hold a higher risk with respect to future inflation; if, for example, it is expected that inflation will rise in the near future, investors holding short-term bonds will likely be able to reinvest at higher interest rates. Conversely, to incentivize investors to take a long-term strategy, particularly since long-term inflation is unknown, long-term bonds must offer an additional premium due to the inflation risk.

26. Both of the key principles discussed tend to produce upward sloping yield curves, such that long-term interest rates tend to maintain a “maturity spread” above short-term interest rates.

V. Swedish, German, and U.S. Government Bond Markets

27. We now turn to the Swedish market to explore the term structure of its government bond market and compare it against the term structures of other comparable markets, including the U.S. and Germany. We first begin with a discussion on the importance of bond liquidity when choosing a risk-free rate. We then discuss our analysis of maturity spreads in Sweden, Germany, and the U.S. Finally, we propose a method of calculating *implied* maturity spreads when long-term bonds are unavailable in a market or are not traded with sufficient liquidity.

28. Academics and valuation practitioners alike recommend that that the risk-free rate should be based only on liquid government securities:

“Longer-dated bonds...might match the cash flow stream better, but their illiquidity means their prices and yield premiums may not reflect their current value.”¹⁷

29. All bonds trade with varying degrees of liquidity. The issue with illiquid bonds is that they run the risk of having yields and prices that are unrepresentative of their actual value and associated risk.

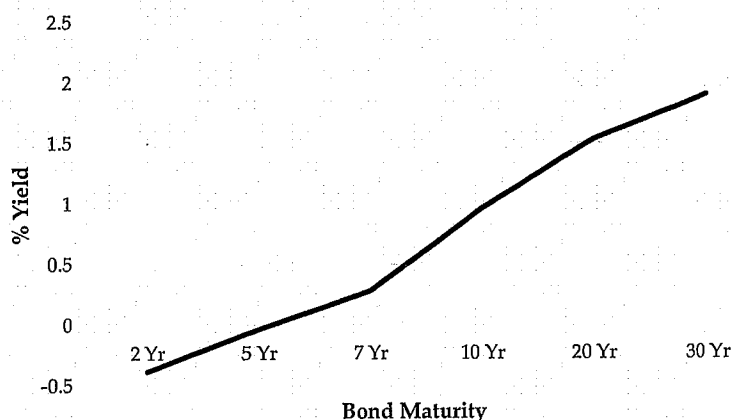
¹⁶ For a discussion of the particular scenarios under which this occurs, see Frank J. Fabozzi and T. Dossa Fabozzi, eds., *The Handbook of Fixed Income Securities*, 4th ed. (Chicago: Irwin Professional Publishing, 1995), pp. 132-133.

¹⁷ Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 5th ed. (New Jersey: John Wiley & Sons, Inc., 2010), p. 237.

However, with respect to Sweden, the long-term Swedish bonds appear to possess sufficient liquidity for use as a risk-free rate. We tested this assumption by comparing maturity spreads in the Swedish market to those in the U.S and German markets. We present this analysis in the paragraphs below.

30. The Swedish market possesses a creditworthy government bond market, and has recently experienced a strong demand for its government bonds.¹⁸ Several characteristics inform this observation, such as the fact that Sweden is considered a rare borrower, possesses the highest credit rating, and maintains a strong resistance to volatility in the Eurozone.¹⁹ Sweden offers government bonds in a range of maturities. The 2-year, 5-year, 7-year, and 10-year bonds were issued beginning in the mid-1980s.²⁰ In 2012 and 2009, respectively, Sweden also issued 20-year and 30-year bonds.²¹ Finally, Sweden also offers Treasury *bills* in maturities of 1 month, 3 months, 6 months, and 1 year. In our current analysis, we focus only on Sweden's *bonds*, particularly those in the 10 to 30 year maturity range. In Figure 3 below, we display the yields on Swedish bonds as of April 2016.²²

Figure 3 – Swedish Government Bond Yield Curve, April 2016



¹⁸ Swedish National Debt Office (Riksgälden), Strong Demand for Swedish Government Bonds, 11 June 2012.

¹⁹ Swedish National Debt Office (Riksgälden), Strong Demand for Swedish Government Bonds, 11 June 2012.

²⁰ Sveriges Riksbank, Interest & Exchange Rates, <http://www.riksbank.se/en/Interest-and-exchange-rates/search-interest-rates-exchange-rates>.

²¹ Per Bloomberg.

²² Bond yields are as of 26 April 2016. Yields for the 2-, 5-, 7-, and 10-year bonds are from Sveriges Riksbank, <http://www.riksbank.se/en/Interest-and-exchange-rates/search-interest-rates-exchange-rates>. Yields for the 20- and 30-year bonds are per Bloomberg.

31. We observe several key characteristics with respect to the Swedish government bond yield curve depicted above in Figure 3.
32. First, the yields on the 2- and 5-year bonds are *negative*, which is reflective of recent expansionary monetary policy undertaken by Sweden's Central Bank in an effort to meet the inflation target of 2 percent and keep the krona from appreciating.²³ As we will discuss in greater detail in Section VI, the volatility of short-term interest rates and their tendency to reflect short-term monetary policy, is one reason why normalized long-term rates ought to be preferred when calculating the risk-free rate.
33. Second, we observe that the yield curve displayed in Figure 3 displays the typical upward-sloping shape that we would expect from a market such as Sweden's. The term structure of its interest rates provides us further confidence that Swedish government bonds are a reliable asset on which to base the risk-free rate, since the market does not exhibit the inverted or flat term structures that are typically associated with an imminent recession or economic downturn.
34. Third, we considered the maturity spread between the 10- and 20-year bonds as well as between the 20- and 30-year bonds. The spot rates prevailing as of the time of this report in Figure 3 reflect a premium of 0.57 percent of the 20-year bond over the 10-year bond and a premium of 0.94 percent of the 30-year bond over the 10-year bond. If we compare the average spreads over a four-year time horizon²⁴, we note that the spreads across all bonds decrease slightly. The spot and average maturity spreads are summarized in Table 2 below.

Table 2 – Swedish Bond Maturity Spreads (%)²⁵

Maturity Spread	Spot	Average 4 Yr
10 to 20 Year	0.569	0.513
10 to 30 Year	0.936	0.707

35. For comparison we also reviewed the government bond markets in both the United States and Germany, as they are viewed as mature, highly liquid, and very creditworthy. As with Sweden, we

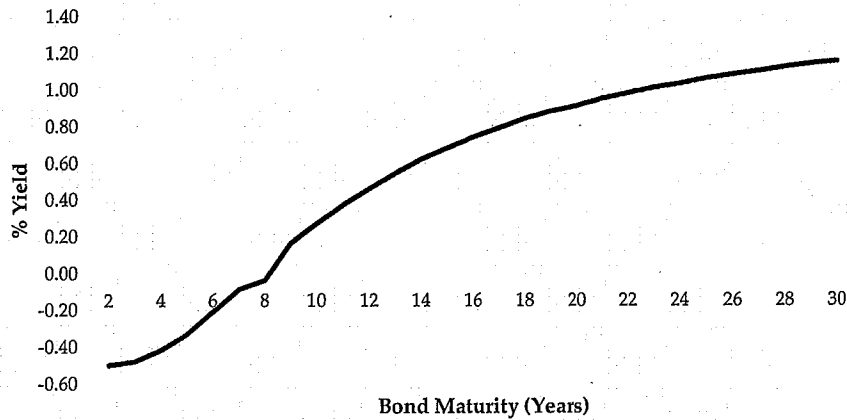
²³ Richard Milne, Riksbank cuts rates deeper into negative territory," *Financial Times*, 11 February 2016; John Carlstrom and Amanda Billner, "Sweden Cuts Rates Deeper Into Negative Territory, Says May Go Further," *Bloomberg*, 11 February 2016.

²⁴ Note that we are unable to take longer averages since the 20-year bond was only first issued in early 2012 and the 30-year bond was only first issued in 2009.

²⁵ The spot maturity spreads are calculated as of 26 April 2016. The averages are *four-year* averages as of 26 April 2016. 10-year bond data is per Sveriges Riksbank (Swedish Central Bank) and 20-year and 30-year bond data is per Bloomberg.

calculated spot and normalized maturity spreads for German bonds with the same maturities. In Figure 4 below, we present the yield curve for German government bonds as of April 2016.

Figure 4 – German Government Bond Yield Curve, April 2016²⁶



36. The German yield curve exhibits many of the same features as the Swedish yield curve, including negative interest rates for bonds with maturities of 8 years or less, an upward-sloping shape, and similar maturity spreads. The spot rates shown in Figure 4 reflect a premium of **0.64** percent of the 20-year bond over the 10-year bond and a premium of **0.88** percent of the 30-year bond over the 10-year bond. We find that these spreads closely track those of Sweden. In fact, compared to the Swedish bonds, the maturity spread between the 30- and 10-year German bonds differs by only 6 percent (0.936 versus 0.880). Comparing the average spreads over several time horizons, we observe that, when averaged over four years, German spreads are slightly higher than those of Sweden. However, the German average over longer time horizons, such as over 10 and 15 years, tends to stabilize at a lower spread of between 0.6 and 0.7 percent. In Table 3, we summarize the maturity spreads for German bonds.

Table 3 – German Bond Maturity Spreads (%)²⁷

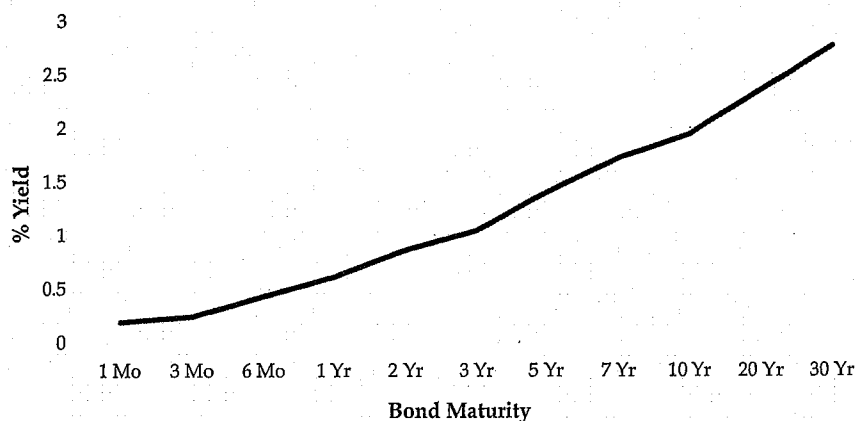
Maturity Spread	Spot	Average		
		4 Yr	10 Yr	15 Yr
10 to 20 Year	0.640	0.828	0.640	0.609
10 to 30 Year	0.880	0.843	0.632	0.673

²⁶ All yield data is per Deutsche Bundesbank, Capital Market Statistics, “Daily term structure of interest rates in the debt securities market.” All bond yields are as of 26 April 2016.

²⁷ The spot maturity spreads are calculated as of 26 April 2016. The averages are 4, 10, and 15-year averages as of 26 April 2016. All yield data is per Deutsche Bundesbank.

37. Finally, we analyzed the U.S. Treasury bond market. In Figure 5 below, we present the yield curve for U.S. government bonds as of April 2016.

Figure 5 – U.S. Government Bond Yield Curve, April 2016²⁸



38. Again, the U.S. yield curve exhibits many of the same characteristics as the Swedish and German yield curves, although we note that U.S. Treasury bonds do not carry negative interest rates at any maturity. The spot rates shown in Figure 5 reflect a premium of **0.41** percent of the 20-year bond over the 10-year bond and a premium of **0.82** percent of the 30-year bond over the 10-year bond. The current maturity spreads approximate those of both Sweden and Germany; in particular, the current 10- to 30-year premium on U.S. Treasury bonds (0.82) is only slightly lower than that of Germany (0.88) and Sweden (0.94). If we *average* U.S. Treasury spreads over several time horizons, we find that a 4-year average results in spreads similar to that in Sweden. If we average over 10 or 15 year time horizons, we see that the maturity spreads stabilize within close range of those in Germany. In Table 4 below, we show the maturity spreads for U.S. Treasury bonds.

Table 4 – U.S. Treasury Bond Maturity Spreads (%)²⁹

Maturity Spread	Spot	Average		
		4 Yr	10 Yr	15 Yr
10 to 20 Year	0.410	0.583	0.618	0.638
10 to 30 Year	0.820	0.904	0.783	0.747

²⁸ All yield data is per the U.S. Department of the Treasury, Resource Center, "Daily Treasury Yield Curve Rates." All bond yields are as of 26 April 2016.

²⁹ The spot maturity spreads are calculated as of 26 April 2016. The averages are 4, 10, and 15-year averages as of 26 April 2016. All yield data is per the U.S. Department of the Treasury.

39. Finally, Table 5 below summarizes the maturity spreads for all three countries. Table 5 demonstrates that the spread between Swedish 10-, 20-, and 30-year bonds is consistent with those observed in the larger benchmark markets. We find that a maturity spread of between 0.5 and 0.9 percent above the 10-year yield is an acceptable range, depending on whether a 20-year or 30-year bond is used as the basis for the risk-free rate. We further note that, if data were available such that we could average Swedish spreads over 10 or 15 year time frames, we would expect Swedish spreads to track those of the U.S. and Germany.

Table 5 – Bond Maturity Spreads by Country

Country	10 to 20 Year				10 to 30 Year			
	Spot	Average			Spot	Average		
		4 Yr	10 Yr	15 Yr		4 Yr	10 Yr	15 Yr
Germany	0.640	0.828	0.640	0.609	0.880	0.843	0.632	0.673
Sweden	0.569	0.513	NA	NA	0.936	0.707	NA	NA
U.S.	0.410	0.583	0.618	0.638	0.820	0.904	0.783	0.747

40. The fact that the maturity spreads across all three bonds markets tend to closely track one another suggests that Sweden's bond market possesses similar liquidity. However, to the extent that Swedish 20- and 30-year bonds are still considered illiquid, Table 5 above also demonstrates that the impact on yields is difficult to discern.

41. If a bond market is indeed illiquid, or if a market does not possess long-term government bonds at all, one can derive a long-term risk-free rate using the maturity spreads in comparable markets (*i.e.*, adding the incremental yield between 10- and 20-year or 10- and 30-year U.S. or German bonds to the Swedish 10-year bond). In cases where long-term government bonds are unavailable, Professor Damodaran also endorses the estimation of a risk-free rate based on bonds denominated in non-local currencies.³⁰ Professor Damodaran's method estimates nominal risk-free rates in a local currency by adding expected inflation in that currency to the real risk-free rate based on U.S. Treasury bonds.³¹

³⁰ Aswath Damodaran, "What is the risk free rate? A Search for the Basic Building Block," December 2008, p. 20.

³¹ "Since the risk free rate in any currency can be written as the sum of expected inflation in that currency and the expected real rate, we can try to estimate the two components separately. To estimate expected inflation, we can start with the current inflation rate and extrapolate from that to expected inflation in the future. For the real rate, we can use the rate on the inflation indexed US treasury bond rate, with the rationale that real rates should be the same globally." Aswath Damodaran, "What is the risk free rate? A Search for the Basic Building Block," December 2008, p. 20.

Our approach relies on nominal interest rates but is, in effect, the same because we implicitly assume that inflation expectations are similar across all three markets (U.S., Germany, and Sweden). Projected inflation estimates from the International Monetary Fund World Economic Outlook confirm this assumption. Long-term projected inflation in the U.S., Germany, and Sweden is estimated at 2.2 percent, 2.0 percent, and 2.1 percent, respectively.³²

42. As a final review of Sweden's bond market liquidity, we considered bid-ask spreads on Swedish bonds' yield to maturities, which is one commonly employed measure of daily liquidity.³³ In general, the more liquid and widely traded a security, the narrower the bid-ask spread. We thus considered the bid-ask spread on all three of Sweden's long-term government bonds as compared with U.S. Treasuries. A 5-year average of the bid-ask spread on 10- and 30-year U.S. Treasury bonds results in a spread of less than -0.1 percent.³⁴ Sweden's 10-year bond trades with an average bid-ask spread of -0.6 percent, and its 20-year and 30-year bonds trade with spreads of -2.4 percent and -1.7 percent, respectively.³⁵ While greater than the highly liquid U.S. bonds, the Swedish bid-ask spreads appear to evidence sufficient liquidity. Indeed, the Financial Supervisory Authority in Sweden recently issued an analysis confirming that all Swedish government bonds are considered liquid.³⁶
43. Thus, whether the valuation expert chooses to calculate the risk-free rate for Sweden using the U.S. and German maturity spreads, or simply use actual Swedish long-term yields, the result is essentially the same.

VI. Adjusting for the Recent Downward Bias in Yields

44. In Section V above, we showed that Swedish long-term bonds exhibit a normal upward sloping yield curve and that the spreads are consistent with the maturity spreads implied by the U.S. and Germany. However, in considering these yields as the basis for a long-term risk-free rate we have to take into account that a downward bias in government bond yields has been and is still present in both

³² International Monetary Fund, World Economic Outlook, April 2016.

³³ Raphael Schestag, Philipp Schuster, and Marliese Uhrig-Homburg, "Measuring Liquidity in Bond Markets," *The Review of Financial Studies* (13 August 2015): 2-3.

³⁴ The bid-ask spread is calculated as follows: $\text{Spread (\%)} = 100 \times (\text{Ask} - \text{Bid}) / \text{Ask}$.

³⁵ Spreads are calculated using the yield-to-maturity bid and ask prices on a daily basis. All bid-ask spreads are averaged since first issuance of the bond. Bid and ask prices are per Bloomberg.

³⁶ Nordea Markets, "Swedish Finansinspektionen publishes preliminary view on liquid bonds under MiFID II," 11 March 2016, <http://insights.nordeamarkets.com/en/2016/03/11/swedish-finansinspektionen-publishes-preliminary-view-on-liquid-bonds-under-mifid-ii>. Also see the report from the Swedish Financial Supervisory Authority: http://www.fi.se/upload/43_Utredningar/20_Rapporter/2016/marknadrapp_2016ny4.pdf

European and U.S. markets (since 2008), mainly as a result of programs that introduced significant capital into the markets through massive bond purchases, which in turn, caused bond yields to fall. Indeed, the 3rd round of quantitative easing (“QE3”) only ended in the U.S. as of October 2014, which followed two other rounds of quantitative easing after the 2008 financial crisis. Recent evidence suggests that the 10-year U.S. Treasury bond is still trading at an all-time low.³⁷ In Europe, ten-year European bond yields hovered above 6 percent in the 1990s and are now in the 2 to 3 percent range.³⁸ As we showed in Figures 3 and 4 above, short-term real government rates are still *negative*. In Sweden, specifically, the spot yield on a 10-year government bond was 2.5 percent as of year-end 2013, which fell 1.6 percent by year-end 2014 to 0.9 percent.³⁹ Various other European countries experienced, on average, a decrease in yield of 1.7 percent between 2013 and 2014.⁴⁰

45. The solution offered by valuation experts to the current abnormality in rates is to use a “normalized” long-term risk-free rate to avoid incorporating the effects of government monetary policy, such as quantitative easing. One approach is to use an average yield over a longer period, which serves to eliminate the downward bias that monetary policy can create on government bond yields.⁴¹

46. Specifically, McKinsey recommends the following approach:

“To overcome the inconsistency between interest rates on government bonds and market values of equities, we recommend using a synthetic risk-free rate. To build a synthetic rate, add the expected inflation rate of 2.5 percent to the **long-run average real interest rate of 2 percent, which leads to a synthetic risk-free rate of 4.5 percent.** Although it is different from the actual yield, the synthetic yield is based on our judgment that the low interest rates are an aberration caused by the unusual monetary policy and a flight to safety. As the economy returns to historical levels, we believe the government bond rates will rise to historical levels. **The result is a cost of equity for the market of about 9.5 percent even during these times of historically low interest rates.** If market prices eventually rise to reflect low interest rates (or interest rates rise to reflect market prices), make sure to reevaluate your perspective.” [emphasis added]

³⁷ Min Zeng, “U.S. Government Bond Yields Low, Despite Rally in Equities,” *Wall Street Journal*, 19 April 2016.

³⁸ EY, *Estimating Risk-Free Rates for Valuations*, p. 2.

³⁹ EY, *Estimating Risk-Free Rates for Valuations*, p. 4.

⁴⁰ EY, *Estimating Risk-Free Rates for Valuations*, p. 4.

⁴¹ Grabowski, Roger J., *Mid-2011 Risk-Free Update and ERP Update*, 28 July 2011, p. 5.

47. Duff & Phelps (a company that provides data for valuation practitioners), also supports the use of a risk-free rate based on a 20-year U.S. bond normalized to avoid the current depressed rates:

“Many analysts select the 20-year (constant-maturity) U.S. government bond yield as of the valuation date as a reasonable proxy for the risk-free rate. However, during times of extreme economic distress, yields on U.S. government bonds may be artificially low due to a ‘flight to quality’, or other factors. For example, rapid shifts of investments may cause treasury bond yields to be driven down and be less than the theoretical construct of a risk free rate (i.e., real rate of interest + expected inflation + horizon premium)... During periods in which risk free rates appear to be abnormally low due to flight to quality issues (or other factors) one might consider either normalizing the risk-free rate or adjusting the equity risk premium (ERP).”⁴²

48. Other reputable sources, such as Dr. Shannon Pratt and Dr. Walter Grabowski, also take the realistic view that government bond rates in recent years do not represent the risk-free rate:

“Financial crises are often accompanied by a flight to quality such that the nominal returns on ‘risk free’ securities fall dramatically for reasons other than inflation expectations and thus, without adjustment, become less reliable as the best indicator of the risk-free rate.”⁴³

49. Pratt and Grabowski provide an example of using a nominal risk-free rate of 4.5 percent as a “normalized risk-free rate of return” in December 2008, at a time when the financial crisis started affecting actual rates.⁴⁴

VII. Effect of Long-Term Risk-Free Rate on the ERP

50. As described above, the ERP represents the premium *above* the risk-free rate that investors require for taking the increased risk associated with equity investments. The generalized relationship between the two forms the basis of calculating the ERP. In this section, we address the historical relationship between the two, what it implies for the ERP generally, and, more specifically, what it implies for equity investments going forward in Sweden.

⁴² Duff & Phelps, Risk Premium Report 2012 (excerpt), pp. 14-15.

⁴³ Pratt, Shannon and Grabowski, Roger. *Cost of Capital, Applications and Examples*. Fourth Edition, 2009, p. 92.

⁴⁴ Pratt, Shannon and Grabowski, Roger. *Cost of Capital, Applications and Examples*. Fourth Edition, 2009, p. 93.

51. Although the application of ERPs is typically forward-looking, the estimation of the ERPs most commonly relies on historical data.⁴⁵ While there is no single accepted method for estimating the ERP using historical data, there are some principal elements that any estimation should incorporate.
52. First, in calculating the risk premium difference, one must make a comparison of investments of similar durations. Equity is a long-term investment. Year-to-year returns in the public equity markets can change dramatically. Only over long periods can we observe stable returns. The choice of a risk-free rate must therefore be consistent with the long-term nature of how the return on equity investments is calculated. While shorter term rates are sometimes used, they are not ideal. Shannon Pratt acknowledges this and states that the preferred term is 20-years. He reasons that interest rate risk in shorter terms and the fact that equities are a long-term investment. As we demonstrate below, the periods over which the average returns on equity are calculated based on historical data span 100 years or more. Another common source for historical based ERPs, Professors Dimson, Marsh, and Staunton target the use of 20-year bonds for all countries.⁴⁶
53. A second consideration is what to use as the proxy for an equity investment and, consequently, the expected return on an equity investment. Often this estimate is based on the historical returns of the country's stock market where the investment is located. However, this may not accurately reflect expected equity returns:

“If it is difficult to estimate a reliable historical premium for the US market, it becomes doubly so when looking at markets with short, volatile and transitional histories. This is clearly true for emerging markets, where equity markets have often been in existence for only short time periods (Eastern Europe, China) or have seen substantial changes over the last few years (Latin America, India). It also true for many West European equity markets. While the economies of Germany, Italy and France can be categorized as mature, their equity markets did not share the same characteristics until recently. They tended to be dominated by a few large companies, many businesses remained private, and trading was thin except on a few stocks.”⁴⁷

⁴⁵ Other approaches include techniques like surveys of academics and professionals.

⁴⁶ Elroy Dimson, Paul Marsh, and Mike Staunton, “The Worldwide Equity Premium: A Smaller Puzzle,” *Handbook of the Equity Risk Premium*, 2008, p. 479.

⁴⁷ “Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition”, Updated: March 2015, Aswath Damodaran, p. 31.

54. With this in mind, the Swedish equity market provided an average real return of 7.9 percent (10.9 percent nominal returns) from 1870 to 2012.⁴⁸ An approach for estimating long-term equity returns for many markets is to use large, liquid, and mature market like the U.S. as a proxy.⁴⁹ In comparison from approximately the same period, 1870 to 2011, U.S. equity markets provided an average real return of 8.2 percent, or 0.3 percent more than in Sweden.⁵⁰ (In the summary of ERPs shown in Table 6 below we show Swedish, U.S. and worldwide ERP estimates.)

55. Third, evidence suggests that the ERP is not constant relative to the risk-free rate. Evidence suggests that the ERP will increase with the risk-free rate. Professor Damodaran, a well-known finance professor at New York University publishes an annual paper on the ERP. In his most recent version, “Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition” he states:

“There is a mildly positive relationship between the T.Bond rate and implied equity risk premiums: every 1% increase in the treasury bond rate increases the equity risk premium by 0.06%. The slope of the yield curve seems to have little impact on the implied equity risk premium. Removing the latter variable and running the regression again... does provide very weak support for the view that equity risk premiums should not be constant but should be linked to the level of interest rates.”⁵¹

56. Thus, while the evidence is weak with regard to the exact adjustment to be made to the ERP, it is informative from a directional perspective. That is, the ERP does not shrink when the risk-free rate increases. Rather, evidence suggests that the ERP will remain the same or even increase with an increase in interest rates.

57. As described above, there is not one approach for using historical data for estimating the ERP. Therefore, sources tend to offer options based on the geography and time period. Based on available

⁴⁸ Rodney Edvinsson, Tor Jacobson, and Daniel Waldenström, Eds., *Historical Monetary and Financial Statistics for Sweden Volume II* (Sveriges Riksbank, 2014): p. 242. Based on the arithmetic mean approach.

⁴⁹ When using an ERP based on a foreign market it is not necessary to adjust in differences in inflation or currency between the countries. As long as the ERP is calculated using equity returns and a risk free rate in the same currency, the effects of currency and inflation are removed in the resulting ERP.

⁵⁰ Jeremy Siegel, “Long-Term Stock Returns Unshaken by Bear Markets,” *Rethinking the Equity Risk Premium*, p. 146. Based on the arithmetic mean approach.

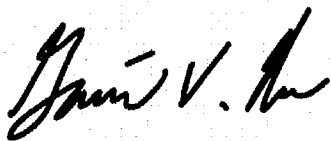
⁵¹ “Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition”, Updated: March 2015, Aswath Damodaran, p. 85.

information we suggest and typically rely on an ERP of 5.5 percent.⁵² Table 6 below summarizes estimates provided by authorities cited in this report.

Table 6 – Summary of ERPs⁵³

Source	Historical ERP	Time Period	Market	Method/Notes
Damodaran	6.3%	1928-2014	U.S.	Arithmetic average of historical returns
Duff & Phelps	5.5%	Forward-looking	U.S.	Based on current economic conditions
Dimson, et al.	7.1%	1900-2001	Sweden	Arithmetic average of historical returns
Dimson, et al.	5.4%	1900-2001	Global	Arithmetic average of historical returns

58. Our estimated ERP of 5.5 percent falls within range of the above estimated ERPs. If we adopt a nominal risk-free rate in the 4 to 5 percent range (2 to 3 percent real rate assuming 2 percent inflation), this implies an expected post-tax nominal market return in the range of 9.5 to 10.5 percent (7.5 to 8.5 percent real return assuming 2 percent inflation).



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27 May 2016



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27 May 2016

⁵² Based on an arithmetic mean approach in general situations.

⁵³ "Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition", Updated: March 2015, Aswath Damodaran, p. 30; Duff & Phelps, "Client Alert, Duff & Phelps Increases U.S. Equity Risk Premium to 5.5% , Effective January 31, 2016," 16 March 2016, pp. 35-37; EY, "The Swedish Energy Markets Inspectorate: WACC for gas network companies for the regulatory periods 2012, 2013, and 2015-2018," 2 September 2014, p. 17.

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Professional Summary

Mr. Kaczmarek is a Managing Director in the Dispute & Investigative Division and leads the firm's International Arbitration group. Mr. Kaczmarek serves as an expert and consultant on issues involving business and investment valuation, finance, accounting, and economics in a wide range of industries such as financial services, manufacturing, energy, utilities, telecoms, mining, healthcare, luxury goods, and business services.

Mr. Kaczmarek has been appointed as a financial and valuation expert for private companies as well as sovereign states in more than 120 disputes including more than 100 international arbitrations, and more than 90 investor-state arbitrations. He has been appointed as an expert in more than 20 cases where damages claimed exceeded US\$ 1 billion (including 7 matters where damages claimed have exceeded US\$ 10 billion).

The disputes Mr. Kaczmarek has helped clients and arbitral tribunals resolve have been in North, Central and South America; Western, Central, and Eastern Europe; the Commonwealth of Independent States; the Russian Federation; Southeast Asia; the Caribbean; Africa; and the Middle East. Mr. Kaczmarek received the internationally-recognized designation of Chartered Financial Analyst from the CFA Institute in 1998.

Expert Engagements in International Arbitration or Foreign Litigation

Mr. Kaczmarek has served as financial expert and/or consultant in the following international arbitrations and foreign litigations:

Marfin Investment Group Holdings S.A. et al v Republic of Cyprus

Prepared an expert report (December 2015) regarding the losses suffered by investor in a commercial bank in Cyprus. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant)

Industry: Banking and Financial Services

B3 Croatian Courier Coöperatief U.A. v Republic of Croatia;

Prepared an expert report (November 2015) regarding the losses suffered by an investor in the postal services market in Croatia. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Postal Services

Avisep S.A. de C.V & Bevisep S.A. de C.V. v The Sherwin-Williams Company & Sherwin-Williams (Caribbean) N.V.

Prepared two expert reports (June 2015, November 2015) regarding the losses incurred by claimants for a

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failed transaction with respondent. Breach of Share Purchase Agreement, ICC (engaged by claimants, expert and consultant).

Industry: Manufacturing

EVN AG v Republic of Bulgaria

Prepared an expert report on the possible losses of an electricity distributor due to decisions implemented by the regulator. Bilateral Investment Treaty and Energy Charter Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Power Sector

Air Liquide Korea Co. Ltd v Dongbu Steel Co. Ltd.

Prepared an expert report (September 2015) quantifying Claimant's losses for an alleged improper termination of a contract to supply air products to a steel mill in Korea. Breach of Contract, ICC (engaged by claimant, expert and consultant).

Industry: Manufacturing

Union Fenosa Gas S.A. v Arab Republic of Egypt

Prepared an expert report (August 2015) quantifying the losses incurred by claimant from its investment in a natural gas liquefaction plant for non-deliveries of natural gas. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Gas Supply and LNG

Lukoil Eurasia Petrol A.Ş., Lukoil Europe Holdings B.V., Lukoil International Invest (BV) Ltd, Lukoil Holding GmbH, Lukoil Investments Ltd v Aytemiz Petrol San Ve Tic A.Ş., İsmail Aytemiz, Hüseyin Aytemiz, Ali Aytemiz, İ. Gökhan Aytemiz

Prepared an expert report (July 2015) addressing Claimants' alleged losses for representations and warranties in a share purchase agreement for a fuel distribution business in Turkey. Oral evidence given in January 2016. Post-Acquisition Dispute under and SPA, Swiss Chamber of Commerce (engaged by respondent, expert and consultant)

Industry: Fuel Distribution

Aeroport Belbek LLC & Mr. Igor Valerievich Kolomoisky v Russian Federation

Prepared an expert report (June 2015) addressing the alleged damages and fair market value of an airport in Crimea. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Airport

LG Life Sciences, Ltd. v Chiesi USA Inc. (Commercial Dispute, ICC)

Prepared two expert reports (May 2015, August 2015) addressing the alleged losses sustained by Claimant due to Respondents alleged failure to properly market a pharmaceutical product. Oral evidence given in September 2015. Breach of Contract Dispute (engaged by Respondent, expert and consultant).

Industry: Pharmaceutical

Zelena N.V. & Energo Zelena D.O.O. v Republic of Serbia

Confidential and Proprietary

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Prepared an expert report (June 2015) addressing the alleged damages and fair market value of a rendering plant. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Rendering Plant

Alghanim v Alghanim

Prepared two fact witness reports and two expert reports (March 2015, October 2015) addressing a valuation undertaking for Alghanim Industries and the fair market value of Alghanim Industries. Oral evidence given in December 2015. Commercial Dispute, ICC (engaged by respondent/co-claimant, expert and consultant).

Industry: Conglomerate

Transban Investments Corp. v. Bolivarian Republic of Venezuela

Prepared an expert report (February 2015) quantifying the fair market value of the exclusive importer and distributor of BMW cars into Venezuela. Bilateral Investment Treaty Dispute (engaged by claimant, expert and consultant).

Industry: Retail

Edenred SA v Hungary

Prepared two expert reports (January 2015, July 2015) addressing the alleged damages caused to a meal voucher company. Oral evidence given in November 2015. Bilateral Investment Treaty Dispute & Foreign Investment Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Food Services

IBM de Mexico, Comercializacion y Servicios, S. de R.L de C.V v IUSACELL, S.A. de C.V.

Prepared three experts report (January 2015, May 2015, January 2016) quantifying the losses sustained by Claimant for the alleged wrongful termination of a master services agreement for information technology services and the alleged losses sustained by Respondent for an alleged material breach of the master services agreement. Breach of Contract, ICC (engaged by claimant, expert and consultant).

Industry: Telecom

MNSS B.V. & Recupero Credito Acciano N.V. v Montenegro

Prepared an expert report (November 2014) quantifying the fair market value of a steel mill and potential investors losses once the mill entered bankruptcy proceedings. Oral evidence given in June 2015. Bilateral Investment Treaty Dispute & Foreign Investment Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Steel Mill

Consolidated Exploration Holdings Ltd, et al v Kyrgyz Republic

Prepared an expert report (September 2014) quantifying the fair market value of gold mining project that was terminated by the Kyrgyz government. Case settled prior to an oral hearing. Bilateral Investment Treaty Dispute & Foreign Investment Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Mining

Venezuela US SRL v Bolivarian Republic of Venezuela

Prepared an expert (September 2014) addressing alleged false financial reporting with respect to an oil project in Venezuela and the fair market value of that project in the absence of the false reporting. Bilateral Investment Treaty Dispute, PCA (engaged by claimant, expert and consultant).

Industry: Oil & Gas

Spence International Investments, LLC et al v Republic of Costa Rica

Prepared an expert report (July 2014, December 2014) regarding the fair market value of real property along the Gold Coast of Costa Rica that was reserved for a national park. Oral evidence given in April 2015. Multilateral Investment Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Land Development

Spentex B.V v Republic of Uzbekistan

Prepared two expert reports (July 2014, May 2015) regarding the losses and fair market value of textile mills in Uzbekistan that are alleged to have been forced into insolvency by government actions. Oral evidence given in September 2015. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Textile Manufacturing

Eulen, S.A. v Jose C. Lorenzo

Prepared an expert report (June 2014) regarding the alleged damages suffered by Claimant due to alleged withholding of material information in a transaction concerning an airline services company. Oral evidence given in August 2014. Share Purchase Agreement Dispute, ICC (engaged by Respondent).

Industry: Air Transportation

Autoridad Portuaria De Manta v Terminales Internacionales De Ecuador, S.A. (In Liquidation), Ltd (Now Hutchison Port Investments, Ltd.), and Hutchison Port Holdings, Ltd.

Prepared an expert report (June 2014, December 2014) regarding the alleged damages suffered by Claimant due to the termination of concession contract to operate the Manta port in Ecuador. Oral evidence given in February 2015. Contract Dispute, Quito Chamber of Commerce (engaged by Respondent).

Industry: Port Concession

Vladislav Kim et. al v Republic of Uzbekistan

Prepared two expert reports (April 2014, May 2015) regarding the fair market value of investments held by Kazakhstan nationals in cement plants in Uzbekistan that were impacted by government actions. Oral evidence given in July 2015. Bilateral Investment Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Cement Production

Mercer International Inc. v. Government of Canada

Prepared two expert reports (March 2014, December 2014) measuring the impact of the differential treatment received by a pulp mill to sell its self-generated green energy and buy regulated utility power on



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the fair market value of the mill. Oral evidence given in July 2015. Bilateral Investment Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Electricity Generation

LSF-KEB Holdings SCA, LSF SLF Holdings SCA, HL Holdings SCA, Kukdong Holdings I SCA, Kukdong Holdings II SCA, Star Holdings SCA, Lone Star Capital Management SPRL, and Lone Star Capital Investments S.à.r.l. v Republic of Korea

Prepared two expert reports (March 2014, January 2015) addressing the impact of various measures on the fair market value of a banking enterprise. Oral evidence given in June 2015. Bilateral Investment Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Financial Services

Fábrica de Vidrios Los Andes, C.A. and Owens-Illinois de Venezuela, C.A. v Bolivarian Republic of Venezuela

Prepared two expert reports (July 2013, March 2014) valuing Claimant's economic interest in two glass manufacturing plants that were expropriated by official decree. Bilateral Investment Treaty Dispute (engaged by claimant, expert and consultant).

Industry: Industrial Manufacturing

Philip Morris Brands Sàrl, Philip Morris Products S.A., and Abal Hermanos S.A. v. Oriental Republic of Uruguay

Prepared an expert report (March 2014, April 2015) measuring the impact of various measures on the fair market value of investments made in the Uruguay cigarette sector. Oral evidence given in October 2015. Bilateral Investment Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Retail

Dunphy, Masfen, Sturgess Arbitration

Prepared two expert reports (February 2014, March 2014) on the fair market value of Greymouth Group Holdings, Inc., a New Zealand oil and gas producing company, for purposes of resolving a shareholder dispute. Oral evidence given in April 2014. Shareholder Agreement Dispute, New Zealand Arbitration Law (engaged by Dunphy).

Industry: Gas Supply

Karkey Karadeniz Elektrik Uretim A.S. v The Islamic Republic of Pakistan

Prepared two expert reports (January 2014, August 2015) value of two powerships and other losses suffered by claimant as a result of the cancellation of a power purchase agreement and the detention of the ships in the Port of Karachi. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Electricity Generation

Pac Rim Cayman LLC v Republic of El Salvador

Prepared two expert reports (January 2014, July 2014) measuring the fair market value of a gold mining

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project. Oral evidence given in September 2014. Foreign Investment Law Dispute (engaged by respondent, expert and consultant).

Industry: Mining

Novera AD, Novera Properties B.V., and Novera Properties N.V. v Republic of Bulgaria

Prepared two expert reports (November 2013, August 2014) assessing the losses and fair market value of a sanitation services concessions that were terminated. Oral evidence given in October 2014. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Waste Management

Baggerwerken Decloedt En Zoon NV v The Republic of the Philippines

Prepared two expert reports (August 2013, August 2014) assessing the banking, financial, and operational data associated with a dredging project and an opinion on the proper manner in which damages ought to be quantified for a second project that ultimately did not move forward. Oral evidence given in March 2014. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Dredging

Agility For Public Warehousing Company K.S.C. v The Islamic Republic of Pakistan

Prepared three expert reports (August 2013, September 2014, May 2015) calculating the losses and fair market value of a customs processing enterprise that was terminated by respondent. Case settled before an oral hearing. Bilateral Investment Treaty Dispute (engaged by claimant, expert and consultant).

Industry: Customs Processing

Tidewater Investment SRL and Tidewater Caribe S.A. v Bolivarian Republic of Venezuela

Prepared two expert reports (July 2013, January 2014) determining the fair market value of an offshore supply vessel company that was expropriated by official decree. Oral evidence provided in June 2014. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Oil Services

Progas Energy Limited, Progas Holdings Limited, Sheffield Engineering Company Limited v The Islamic Republic of Pakistan

Prepared two expert reports (July 2013, March 2014) determining the fair market value of bulk liquids import terminal that failed due to energy price regulation. Oral evidence given in February 2015. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: LPG Trading

Orascom Telecom Holdings S.A.E. v People's Democratic Republic of Algeria

Prepared two expert reports (June 2013, March 2014) regarding the fair market value and of a mobile telecom operator and the alleged damages it suffered from alleged treaty violations. Case settled prior to an oral hearing. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Telecom

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Republic of Philippines v PIATCO

Prepared an affidavit (August 2013) on behalf of the Office of the Solicitor General of the Philippines regarding the proper approach to determine the replacement cost of an airport terminal. Court of Appeals, Third Division Manila, Philippines (engaged by Plaintiff, expert and consultant).

Industry: Airport

Fraport AG Frankfurt Airport Services Worldwide v Republic of the Philippines

Prepared two expert reports (June 2013, August 2013) regarding compensation issues and potential money laundering activities. Oral evidence given in September 2013. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Airport

Adel a Hamadi al Tamimi v Sultanate of Oman

Prepared two expert reports (June 2013, March 2014) regarding the fair market value of a limestone quarry allegedly affected by violations of a free trade agreement. Oral evidence given in May 2014. Free Trade Agreement Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Mining

Ali Allawi v The Islamic Republic of Pakistan

Prepared two expert report (March 2013 and March 2014) determining the fair market value of bulk liquids import terminal that failed due to energy price regulation. Oral evidence given in February 2015. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: LPG Trading

Rusoro Mining Limited v Bolivarian Republic of Venezuela

Prepared two expert reports (March 2013 and June 2014) to determine the fair market value of various operating and exploration gold mining properties in the Bolivar state of Venezuela and other losses suffered by claimant as a consequence of alleged breaches of a BIT and the nationalization of the gold mining sector. Oral evidence given in February 2015. Bilateral Investment Treaty Dispute, ICSID AF (engaged by claimant, expert and consultant).

Industry: Mining

HQ AB v Mats Qviberg, Stefan Dahlbo, Curt Lönnström, Thomas Erséus, Mikael König, Johan Piehl, Carolina Dybeck Happe, Anne-Marie Pålsson, Pernilla Ström, Johan Dyrefors, KPMG AB, and Investment AB Öresund

Prepared five expert reports (February 2013, June 2014, October 2014, September 2015 (2)) regarding improper valuations prepared by a bank under IAS 39 and IFRS 7 in its derivative trading portfolio. Breach of Fiduciary Duty, Stockholm District Court (engaged by claimant, expert and consultant).

Industry: Financial Services

Vigotop Limited v Republic of Hungary

Prepared two expert reports (January 2013, September 2013) regarding the fair market value of planned

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mega-casino and leisure resort outside of Budapest, Hungary that was allegedly cancelled in violation of a BIT. Oral evidence given in November 2013. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Land Development

Renee Rose Levy de Levi and Gremcitel S.A. v Republic of Peru

Prepared two expert reports (December 2012, June 2013) regarding the impact of the designation of certain lands as being historical on the fair market value of an early stage development project. Oral evidence given in November 2013. Bilateral Investment Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Land Development

First National Petroleum Corp. v OAO Tyumenneftegas

Prepared two expert reports (December 2012 and April 2013) calculating the historical cash flows and current fair market value of various oil fields in Russia subject to a joint venture agreement. Oral evidence given in July 2013. Breach of Contract Dispute, SCC (engaged by Claimant, expert and consultant).

Industry: Oil Production

Gambrinus, Corp. v Bolivarian Republic of Venezuela

Prepared two expert reports (November 2012, August 2013) establishing the fair market value of a fertilizer production plant subject to an official expropriation decree. Oral evidence given in March 2013. Bilateral Investment Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Chemicals

Türkiye Petrolleri Anonim Ortaklığı v Republic of Kazakhstan

Prepared two expert reports (November 2012, September 2013) assessing the impact of changes in the tax regime applicable to oil and gas producers on the fair market value of certain oil fields under a joint venture agreement. Case settled prior to oral hearing. Energy Charter Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Oil Production

E.D.F. International v Republic of Hungary

Prepared two expert reports (October 2012, October 2013) on the financial impact of termination of power purchase agreements on the fair market value of a gas-fired power generator following a European Commission investigation. Oral evidence given in December 2013. Energy Charter Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Electricity Production

OI European Group B.V. v Bolivarian Republic of Venezuela

Prepared two expert reports (August 2012, June 2013) on the fair market value of Claimant's economic interest in two glass manufacturing plants that were expropriated by official decree. Oral evidence given in

September 2013. Bilateral Investment Treaty Dispute (engaged by claimant, expert and consultant).

Industry: Industrial Manufacturing

Nova Scotia Power Inc. v Bolivarian Republic of Venezuela

Prepared an expert report (May 2012) on the fair market value of Claimant's intangible rights to purchase coal at prices less than market prices. Case was dismissed on jurisdictional grounds. Bilateral Investment Treaty Dispute, ICSID AF (engaged by claimant, expert and consultant).

Industry: Electricity Production

Luigiterzo Bosca v Republic of Lithuania

Prepared two expert reports (March and June 2012) quantifying the fair market value of an alcohol production facility and the losses associated with an opportunity to acquire a shareholding in the facility. Oral evidence given in September 2012. The tribunal found Lithuania to have breached the treaty, but did not award any damages. Bilateral Investment Treaty Dispute; UNCITRAL (engaged by respondent, expert and consultant).

Industry: Retail

The Swatch Group Ltd. & Tiffany Watch Company Ltd. v Tiffany and Company, Tiffany (NJ) Inc., and Tiffany & Co.

Prepared two expert reports (March 2012 and August 2012) quantifying the fair market value of a luxury watch manufacturing enterprise and related losses incurred by Respondents for alleged breaches of agreements to manufacture and distribute luxury watches. Oral evidence given in October 2012. Breach of Contract, Netherlands Arbitration Institute (engaged by respondent, expert and consultant).

Industry: Retail

Devas Multimedia Private Limited v Antrix Corporation Limited

Prepared two expert reports (February 2012, March 2014) on the fair market value of a multimedia company planning to offer mobile audio/visual and broadband wireless internet services through a hybrid satellite-terrestrial system. Oral evidence given in December 2014. Breach of Contract; ICC (engaged by claimant, expert and consultant).

Industry: Telecom

Invar International Inc. v Zorlu Enerji Elektrik Üretim Anonim Şirketi

Prepared three expert reports (February 2012, July 2012, and November 2012) identifying and quantifying the unknown profits made by a subcontractor in the construction of two natural gas-fired power plants in the Moscow region and assessing the impact of cost overruns and financing on the fair market value of the plants. Case settled prior to an oral hearing. Breach of Contract, Geneva Arbitration Association (engaged by respondent, expert and consultant).

Industry: Electricity Production

Renee Rose Levy de Levi v Republic of Peru

Prepared two expert reports (January 2012, September 2012) containing an analysis of the cause of a

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commercial bank failure in 2000 and a rebuttal of the fair market value of the bank and the damages claimed by the investor from the bank's failure. Oral evidence given in November 2012. The tribunal dismissed all claims on the merits. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Financial Services

ConocoPhillips Algeria Ltd. v Sonatrach S.P.A

Prepared two expert reports (January 2012 and August 2012) quantifying the loss suffered by claimant due to respondents alleged failure to implement an equity determination in a unitized oil field in Algeria. Breach of Contract, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

The Attorney General of the Turks & Caicos Islands v Salt Cay Devco Ltd., Salt Cay Estates Ltd., Salt Cay Golf Club Ltd., & SC Hotel Management Ltd.

Prepared three expert reports (December 2011, March 2012, and May 2012) quantifying the fair market value of an early stage, hotel and resort development project on Salt Cay island and the losses claimed by both parties. Fraud and Bribery Claims, Supreme Court of Turks & Caicos (engaged by respondents, expert and consultant).

Industry: Land Development

Flughafen Zürich A.G. and Gestión e Ingeniería IDC S.A. v. Bolivarian Republic of Venezuela

Prepared four expert reports (October 2011, August 2012, February 2013, and August 2013) quantifying the fair market value of a concession to operate the second largest airport in Venezuela on Isla Margarita that was allegedly subject to various treaty violations and analyzing the performance of the airport after a takeover by the state. Oral evidence given in June 2013. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Airport

TECO Guatemala Holdings, LLC v Republic of Guatemala

Prepared an expert report (September 2011 and May 2012) quantifying the impact of an altered regulatory framework on the fair market value of the largest electricity distributor in Guatemala. Oral evidence given in March 2013. The tribunal ruled in favor of Claimant but awarded only historical damages. DR-CAFTA Dispute (engaged by claimant, expert and consultant).

Industry: Electricity Distributor

Convial Callao S.A & CCI-Compania de Concesiones de Infraestructura S.A. v Republic of Peru

Prepared two expert reports (July 2011 and February 2012) on the fair market value a toll road project subject to alleged violations of a BIT. Oral evidence given in March 2012. The tribunal determined that Peru did not breach the treaty. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Toll Road

TSG5 L.P. v Beauty Care Professional Products, S.A.

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Prepared an expert report (June 2011) quantifying the fair market value of a beauty care products company headquartered in Spain. Oral evidence given in January 2012. The tribunal awarded claimant US\$ 135 million. Breach of Contract, ICC (engaged by claimant, expert and consultant).

Industry: Wholesale Trade

Italia Ukraina Gas S.p.a v NJSC Naftogaz of Ukraine

Prepared two expert reports (June 2011 and August 2012) concerning the gas trade between Russia and Europe and the appropriate methodology to determine the price of possible gas exports from Ukraine at the western border with Slovakia. Oral evidence given in September 2012. The tribunal awarded Claimant US\$ 12 million of the US\$ 180 million claimed. Breach of Contract, SCC (engaged by respondent, expert and consultant).

Industry: Gas Trading

SIMCO Consortium and Wood Group Engineering (North Sea) Limited v PDVSA Petroleo S.A.

Prepared three expert reports (March 2011, September 2011, February 2012) quantifying the losses claimed under a long-term contract involving water injection and treatment services in Lake Maracaibo, Venezuela. Oral evidence given in April 2012. The disputed was subsequently settled. Breach of Contract, ICC (engaged by claimant, expert and consultant).

Industry: Oil Services

Yukos Universal Limited v Russian Federation

Prepared two expert reports (September 2010, March 2012) quantifying the fair market value (and related losses) of claimant's investment in Yukos Oil Company OJSC and/or the merged YukosSibneft under various scenarios for alleged violations of the ECT by Russia. Oral evidence given in October 2012. Energy Charter Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

Hulley Enterprises Limited v Russian Federation

Prepared two expert reports (September 2010, March 2012) quantifying the fair market value (and related losses) of claimant's investment in Yukos Oil Company OJSC and/or the merged YukosSibneft under various scenarios for alleged violations of the ECT by Russia. Oral evidence given in October 2012. Energy Charter Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

Veteran Petroleum Limited v Russian Federation:

Prepared two expert reports (September 2010, March 2012) quantifying the fair market value (and related losses) of claimant's investment in Yukos Oil Company OJSC and/or the merged YukosSibneft under various scenarios for alleged violations of the ECT by Russia. Oral evidence given in October 2012. Energy Charter Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

Petrobras America Inc. v Larsen Oil & Gas Ltd

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Prepared three expert reports (December 2010, March 2011, and July 2011) quantifying claimant's losses as a result of the late delivery of an offshore drilling rig. Oral evidence given in August 2011. Breach of Contract Dispute, ICC (engaged by claimant, expert and consultant).

Industry: Oil Services

Yemen Company for Mobile Telephony – Sabafon v Republic of Yemen

Prepared an expert report (October 2010) assessing the performance of a CDMA operator owned by the government and the alleged impact of alleged preferential treatment granted to a state owned competitor on the fair market value of telecommunications provider. The dispute was subsequently withdrawn. Investment Law Dispute, UNCITRAL (engaged by respondent, expert and consultant).

Industry: Telecom

Gold Reserve Inc. v Bolivarian Republic of Venezuela

Prepared four expert reports (September 2010, July 2011, May 2013, June 2013) to determine the fair market value of two gold/copper mining properties in the Bolivar state of Venezuela. Oral evidence provided in October 2013. The tribunal awarded claimant US\$ 731 million. Bilateral Investment Treaty Dispute, ICSID AF (engaged by claimant, expert and consultant).

Industry: Mining

Rozukrenergo AG v EMFESZ kft

Prepared two expert reports (September 2010, December 2010) assessing the position respondent would have occupied in the Hungarian gas trade, but for claimant's alleged failure to fulfill its long-term supply agreement with respondent. Oral evidence provided in January 2011. The tribunal ruled in favor of Claimant. Breach of Contract, SCC (engaged by respondent, expert and consultant).

Industry: Gas Trading

Chevron Corporation and Texaco Petroleum Company v. Republic of Ecuador

Prepared an expert report (September 2010) quantifying the changes made to the financial framework of a concession agreement signed in 1964 between Texaco, Gulf Oil, and Ecuador and the actual and but for economic benefits the parties received under the concession contract. The tribunal ruled in favor of Claimant. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

Marion Unglaube v Republic of Costa Rica

Prepared two expert reports (August and December 2010) calculating the fair market value of undeveloped coastal land and the losses Claimant incurred as a consequence of the creation of a national park. Oral evidence given in February 2011. The tribunal awarded Claimant US\$ 3 million of approximately US\$ 20 million claimed. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Land Development

Reinhard Hans Unglaube v Republic of Costa Rica

Prepared an expert report (August and December 2010) calculating the fair market value of undeveloped coastal land and the losses Claimant incurred as a consequence of the creation of a national park. Oral evidence given in February 2011. The tribunal awarded Claimant US\$ 0. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Land Development

Sojitz Corporation v Prithvi Information Systems Ltd

Prepared an expert report (June 2010) quantifying the claims of both parties for alleged breaches of an equipment procurement contract. Oral evidence given in September 2010. Breach of Contract, LCIA (engaged by respondent, expert and consultant).

Industry: Telecom

Maersk Olie, Algeriet A/S v Peoples Republic of Algeria

Prepared two expert reports (June 2010, May 2011) on the fair market value of hydrocarbon rights that were lost as a consequence of windfall tax legislation passed by the government. The case settled before an oral hearing on the merits with Claimant receiving US\$ 2.2 billion in additional oil over the life of the contract. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Oil Production

Rozukrenerg AG v NJSC Naftogaz of Ukraine

Finalized an expert report (April 2010) quantifying the fair market value of 11 billion cubic meters of natural gas in underground storage facilities in Ukraine (engaged by respondent, expert and consultant).

Industry: Gas Trading

British Petroleum America Production Company v Repsol YPF S.A.

(Breach of Contract, AAA); Prepared an expert report (March 2010) quantifying the losses claimant suffered due to alleged breaches of a contract involving LNG supplies from Trinidad & Tobago to Spain. The case settled before an oral hearing on the merits. Breach of Contract, SCC (engaged by claimant, expert and consultant).

Industry: LNG Trading

HICEE B.V. v Slovak Republic

Prepared an expert report (February 2010) on the fair market value of two health insurance companies operating in the Slovak healthcare market following new legislation which rendered them not-for profit companies. The tribunal rejected jurisdiction in the arbitration. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Health Insurance

Anadarko Algeria Company LLC & Maersk Olie, Algeriet AS v Sonatrach S.P.A.

Prepared two expert reports (February 2010, December 2010) on the fair market value of interests held by Claimants in a production sharing agreement for the exploration and exploitation of liquid hydrocarbons in Algeria. Oral evidence given in July 2011. The case settled before the issuance of an award with Claimants

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receiving US\$ 6.6 billion in additional oil over the life of the contract. Breach of Contract Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

Quimica e Industrial del Borax Ltda. and others v. Republic of Bolivia

Prepared two expert reports (September 2009, August 2013) on the fair market value of a non-metallic mining concession in Bolivia that was the subject of an expropriation decree. Oral evidence given in October 2013. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Chemicals

Concesionaria Dominicana de Autopistas y Carreteras, S.A. v Dominican Republic

Prepared three expert reports (June 2009, December 2009, July 2010) quantifying the fair market value of a toll road concession and the losses claimed by Claimant and Respondent due to delays in the completing the construction of a toll road and critiquing claimant's damages analysis. Oral evidence given in November 2010. The tribunal ruled in favor of Claimant, but relied upon our evidence and awarded US\$ 35 million. Breach of Contract Dispute, ICC (engaged by respondent, expert and consultant).

Industry: Toll Road

Murphy Exploration and Production Company International v Republic of Ecuador

Prepared four expert reports (March 2009, January 2010, September 2012, and July 2014) valuing Claimant's interest in various oil fields in the Republic of Ecuador under the assumption that a law, which significantly reduced the profitability of the oil production activities, was a breach of the relevant BIT. Oral evidence given in November 2014. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

Chevron Corporation and Texaco Petroleum Company v. Republic of Ecuador

Prepared two expert reports (April 2008, November 2008) on the losses suffered in the oil production industry in the Republic of Ecuador for an alleged denial of justice claim. Oral evidence given in April 2009. The tribunal provisionally awarded Claimants US\$ 699 million subject to adjustment in a further proceeding on taxes and interest. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Oil Production

Carpatsky Petroleum Corporation v OJSC Ukrnafta

Prepared two expert reports (December 2008 and August 2009) quantifying the value of a natural gas field in Ukraine and the damages allegedly suffered by claimant for being denied the right to fully participate in the co-development of the field. Oral evidence given in September 2009. Claimant was awarded US\$ 145.7 million for its interest in the gas field. Breach of Contract, SCC (engaged by Claimant, consultant and expert).

Industry: Gas Production

Electrabel S.A. v Republic of Hungary

Confidential and Proprietary

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Prepared two expert reports (May 2009 and December 2009) regarding the historical profitability of a regulated power generator in the Republic of Hungary to assess the economic justification of a rate cut. Oral evidence given in February 2010. The tribunal agreed with our analysis which justified the rate cut. Energy Charter Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Electricity Production

Mercuria Energy Group Limited v Republic of Poland

Submitted two expert reports (April 2009, October 2010) quantifying the fair market of a wholesale fuel business in Poland and the related damages suffered by one of the largest independent energy traders due to the imposition of a fine on the Claimant's. Oral evidence given in February 2011. The tribunal found that Respondent had not breached the ECT. Energy Charter Treaty Dispute, Stockholm Chamber of Commerce (engaged by Claimant, expert and consultant).

Industry: Energy Trading

Grand River Enterprises Six Nations, Ltd., Jerry Montour, Kenneth Hill, and Arthur Montour Jr. v United States of America

Prepared two expert reports (December 2008, April 2009) on the fair market value of a tobacco manufacturing enterprise and its US distributor, as well as the impact of certain regulatory actions on those values, before a NAFTA arbitration panel. Claimant declined cross examination. Damages sought exceed US\$250 million. All claims were dismissed on jurisdictional grounds or the merits. NAFTA Chapter 11 Dispute, UNCITRAL (engaged by Respondent, consultant and expert).

Industry: Retail

Abaclat et al. v Argentine Republic

Prepared five expert reports (November 2008, May 2009, November 2012, July 2013, and November 2013) regarding the manner in which data was gathered, organized, and analyzed for more than 180,000 Italian investors in defaulted Argentine bonds. Third report quantified the losses the remaining 60,000 claimants suffered as a consequence of Argentina's alleged breaches of a BIT. Oral evidence given in April 2010. The tribunal upheld jurisdiction and agreed with our testimony that the data was sufficiently organized to proceed with a mass claim. Bilateral Investment Treaty Dispute, ICSID (engaged by Claimants, consultant and expert).

Industry: Financial Services

Chemtura v Canada

Prepared an expert report (October 2008) on the fair market value and alleged losses suffered by an investor in agricultural pesticide products after the product was de-registered following a scientific review of its safety. Oral evidence given in September 2009. Damages sought exceeded US\$ 80 million. The tribunal found Canada not liable for breaches of the NAFTA. NAFTA Chapter 11 Dispute, UNCITRAL (engaged by Respondent, consultant and expert).

Industry: Chemicals

AES Summit Generation Limited and AES Tisza Erömü Kft v Republic of Hungary

Prepared two expert reports (July 2008, February 2009) on the financial performance of a regulated electric utility from its privatization in 1996 to 2007 to assess the economic justification of a rate cut. Oral evidence given in March 2009. Damages sought exceeded US\$ 20 million. The tribunal reached a conclusion consistent with our financial evidence that the utility was generating excessive profits, thus justifying a reduction in its capacity fees. Energy Charter Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Electricity Production

Piero Foresti, Laura De Carli and others v. Republic of South Africa

Prepared three expert reports – a commercial report assessing the impact of the Mineral and Petroleum Resources Development Act and other legislation on the granite producing industry in South Africa; and two reports concerning the impact of the legislation on the fair market value of two major granite producing companies in South Africa (July 2008). Damages sought exceeded US\$ 50 million. The case was withdrawn by Claimants after their applications for new order mining rights was approved and other matters agreed upon with the Department of Minerals and Energy. Bilateral Investment Treaty Dispute, ICSID (engaged by Claimants, expert and consultant).

Industry: Mining

Sergei Paushok, CJSC Golden East Company, and CJSC Vostokneftgaz Company v The Government of Mongolia

Prepared two expert reports (July 2008, November 2008) evaluating the cost structure of a gold mining company and the impact of windfall tax legislation on the company. Oral evidence given in April 2009. The tribunal sustained one liability claim, but claimant did not pursue a damages phase for the claim. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Mining

Electroandina S.A. (Chile) v YPF S.A. (Argentina)

Prepared an expert report quantifying the contractual damages suffered due to an alleged breach of a long-term natural gas supply contract. The case was withdrawn by claimant before submitting its written pleading. Breach of Contract, ICC (engaged by Claimant, expert and consultant).

Industry: LNG Supply

Walter Bau AG v Kingdom of Thailand

Prepared two expert reports (May 2008, August 2008) on the losses allegedly suffered by a German investor on a build, operate, and transfer toll road project in a Bangkok. Oral evidence given in October 2008. Damages sought exceeded € 120 million. The tribunal awarded Claimant €29 million plus interest from November 2006 based upon a joint calculation from the experts. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by Respondent, expert and consultant).

Industry: Toll Road

Ioannis Kardassopoulos v Georgia

Prepared two expert reports (January 2008, July 2008) on the valuation of a mixed capital oil pipeline

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company and a state-owned pipeline management company as estimates for an investor's losses for alleged breaches of the ECT and BIT. Oral evidence given in March 2009. The tribunal awarded Claimant 100 percent of the amount set forth in our reports. Energy Charter Treaty & Bilateral Investment Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Pipelines

Ron Fuchs v Georgia

Prepared two expert reports (January 2008, July 2008) on the valuation of a mixed capital oil pipeline company and a state-owned pipeline management company as estimates for an investor's losses for alleged breaches of a BIT. Oral evidence given in March 2009. The tribunal awarded Claimant 100 percent of the amount set forth in our reports. Bilateral Investment Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Pipelines

Rumeli Telecom A.S. & Telsim Mobil Telekomunikasyon Hizmetleri A.S. v Republic of Kazakhstan

Prepared an expert report (May 2007) on the valuation of a mobile telecommunications company in Kazakhstan. Damages sought exceeded US\$ 300 million. We opined the company was insolvent and poorly run by Claimant and valued Claimant's shares at US\$ 0 under a liquidation analysis. Oral evidence given in October 2007. The tribunal issued an award concurring with our financial assessment of the company and its management, but awarded Claimant US\$ 125 million for its shares without supporting analysis. Bilateral Investment Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Telecom

Saluka Investments B.V., Nomura Principle Investment plc, and the Czech Republic

Appointed as a valuation expert by the Czech Republic to prepare an expert report on the restructuring and valuation of IP banka a.s. (April 2007) under the settlement terms agreed between the parties for submission to an arbitral tribunal. Oral evidence given in March/April 2008. Claimant's valuation was CZK 68.4 billion and our valuation was CZK 27.4 billion. The Tribunal's award set the value at CZK 34.2 billion. Settlement Procedure related to the Arbitrations Concerning the Collapse of IP banka (engaged by Respondent, expert and consultant).

Industry: Financial Services

Cargill, Inc. v. United Mexican States

Prepared two expert reports (December 2006, June 2007) quantifying the value of Claimant's high fructose corn sweetener ("HFCS") investments in Mexico and the related losses it suffered following various governmental acts which reduced the demand for HFCS in Mexico. Damages sought exceed US\$ 100 million. Oral evidence given in October 2007. The tribunal adopted our damages model and made 3 modifications which reduced damages to US\$ 77,329,240 (plus pre-award interest). This is the largest award under NAFTA Chapter 11 to date. NAFTA Chapter 11 Dispute, ICSID AF (engaged by Claimant, expert and consultant).

Industry: High Fructose Corn Syrup

EDF (Services) Limited v Romania

Prepared two expert reports (October 2006, March 2008) regarding the value of a concession to operate the commercial spaces in Romania's international airports and the damages allegedly sustained by the former concession holder from the United Kingdom. Damages sought exceed \$80 million. Oral evidence given in September 2008. The tribunal issued a decision finding Romania not liable on all counts. Bilateral Investment Treaty Dispute, ICSID (engaged by Respondent, expert and consultant).

Industry: Retail

Glamis Gold, Ltd v. United States of America

Submitted three expert reports (September 2006, March 2007, August 2007) on the fair market value of a gold mining project in California at three different points in time. Claimant alleged the mining licenses were indirectly expropriated when new reclamation regulations affecting metallic mining were passed in 2002. Damages sought were US\$ 50 million. Oral evidence given in August 2007. We opined the mining claims were still worth US\$ 21.5 million immediately after the new regulations. The tribunal dismissed the expropriation claim finding the mining claims were still worth "more than US\$ 20 million". NAFTA Chapter 11 Dispute, UNCITRAL (engaged by respondent, expert and consultant).

Industry: Mining

United Coal Company v Gerdau S.A.

Provided expert and consulting services regarding alleged breaches of a coal supply agreement. Case was amicably settled before any pleadings were exchanged. Breach of Contract Dispute, ICDR (engaged by respondent, expert and consultant).

Industry: Coal Supply

Azpetrol International Holdings, Azpetrol Group & Azpetrol Oil Services Group v Republic of Azerbaijan

Retained as the quantum expert to value an oil services and retail fuel distribution company that was allegedly expropriated by the Republic of Azerbaijan. The parties settled after a hearing on jurisdiction. Energy Charter Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Retail

I&I Beheer B.V. v Bolivarian Republic of Venezuela

Prepared an expert report (September 2006) analyzing certain financial instruments allegedly issued by an agricultural bank in the early 1980s and critiquing the calculation of investment losses claimed by a Dutch investor in those financial instruments. Damages sought exceed US\$ 400 million. Case was discontinued after Claimant failed to file a Reply Memorial on the merits. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Financial Services

Técnicas Reunidas, S.A. and Eurocontrol, S.A. v Republic of Ecuador

Prepared an initial quantification of the losses suffered by an engineering consulting firm contracted to overhaul the Esmeraldas oil refinery in Ecuador. Case settled before proceeding to the pleadings stage.

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Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Oil Refinery

Plama Consortium Limited v. Republic of Bulgaria

Prepared two expert reports (July 2006, July 2007) on the financial performance, turnaround strategy, and fair market value of an oil refinery that was allegedly expropriated through various acts of the State before the International Center for Settlement of Investment Disputes. Damages sought exceeded \$300 million. Oral evidence given in February 2008. The tribunal rejected all of claimant's legal claims and reached a view consistent with our view that claimant's business and financial strategy was flawed and that strategy caused the investment's failure. Energy Charter Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Oil Refinery

Nreka v. Czech Republic

Prepared four expert reports (June 2006, August 2006, October 2007, November 2007) on the value of commercial property in Prague, Czech Republic and the alleged economic harm suffered by a Croatian investor due to the cancellation of certain leasing arrangements before an ad hoc arbitral tribunal employing the UNCITRAL rules of arbitration. Damages sought were approximately US\$ 1.7 million. Oral evidence given in October 2006 and February 2008. We opined that damages correctly calculated would be US\$ 0.5 million. The tribunal issued an award for approximately US\$ 1.25 million. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by respondent, expert and consultant).

Industry: Retail

Duke Energy International Peru Investments No. 1, Ltd v. Republic of Peru

Prepared two expert reports (June 2006, December 2006) on the effect certain tax regulations had on the value of various assets in the electricity sector of Peru that were privatized and the consequential damages resulting from a change in such regulations to an investor in the power generation sector before the International Center for Settlement of Investment Disputes. Damages sought exceed US\$ 35 million. Oral evidence given in May 2007. The tribunal issued an award in favor of Claimant for US\$ 20 million on one of its two claims and accepted our calculation of Claimant's loss on the successful claim without adjustment. Legal Stability Agreement Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Electricity Production

CIT Group, Inc. v. Argentine Republic

Submitted two expert reports (October 2005, February 2008) quantifying the fair market value a leasing enterprise in the Argentine Republic in the aftermath of its economic crisis before the International Center for Settlement of Investment Disputes and claimant's investment losses in that enterprise. Damages sought exceed US\$ 100 million. Claimant and Respondent agreed to discontinue the arbitration in May 2009. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Financial Services

Duke Energy Electroquil Partners and Electroquil S.A. v. Republic of Ecuador

Submitted two expert reports (August 2005, January 2006) quantifying the claimant's investment losses in a diesel-fired power plant in Ecuador due to Ecuador's alleged default on a sovereign guarantee and contract mishandling before the International Center for Settlement of Investment Disputes. Damages sought exceed US\$ 25 million. Oral evidence given in April 2006. The tribunal issued an award in favor of Claimant on some of its claims and awarded damages exceeding US\$ 10.7 million. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Electricity Production

The National Property Fund of the Czech Republic and the Czech Republic v. Nomura Principal Investment plc

Prepared two expert reports (August 2005, December 2005) on behalf of the Czech Republic regarding the costs to transform the Czech banking sector in its transition to a market economy with emphasis on the cost to bailout the third largest Czech bank after its collapse. Total damages sought by Claimants exceeded US\$ 5 billion. Oral evidence given in April 2006. The case settled before an award was issued. Share Purchase Agreement Dispute, Zurich Chamber of Commerce (engaged by claimant, expert and consultant).

Industry: Financial Services

UEG Araucaria Ltda. v. Companhia Paranaense de Energia

Prepared two expert reports (May 2005, December 2005) for the International Court of Arbitration on the value of a gas-fired thermal power plant in the Brazilian state of Parana and losses sustained by a consortium of investors contracted to build it. Damages sought exceeded US\$ 2 billion. Oral evidence given in January 2006. The case settled before an award was issued. Breach of Power Purchase Agreement, ICC (engaged by claimant, expert and consultant).

Industry: Electricity Production

Saluka Investments B.V. v. Czech Republic

Prepared two expert reports (February 2005, March 2005) to an arbitral tribunal organized by the Permanent Court of Arbitration on the cause of failure for a large Czech financial institution. Damages sought were estimated at US\$ 1.4 billion. Oral evidence given in April 2005. The case settled before a damages phase was scheduled. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by respondent, expert and consultant).

Industry: Financial Services

Noble Ventures v. Romania

Prepared and submitted two expert reports (January 2004, August 2004) on the failed privatization and value of a steel mill operation in defense of an expropriation claim brought by a US investor before an arbitral tribunal established under the International Center for Settlement of Investment Disputes. Damages sought exceeded US\$ 400 million. Oral evidence given in October 2004. The tribunal issued an award in favor of Romania on all counts. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Steel Mill

NAVIGANT

Brent C. Kaczmarek, CFA

GAMI Investments v. United Mexican States

Prepared and submitted two expert valuation reports (February 2003, February 2004) on behalf of a US investor to a NAFTA arbitral tribunal on the valuation of a minority stake in a company operating five sugar refineries in Mexico. Damages sought exceeded \$25 million. Claimant did not prevail on the merits in part because the Mexican Supreme Court declared the expropriation unconstitutional and ordered the government to return the sugar mills before the oral hearing in the NAFTA arbitration. Attended hearing, but was not called to provide oral evidence. NAFTA Chapter 11 Dispute, UNCITRAL (engaged by claimant, expert and consultant).

Industry: Sugar Mills

Victor Pey Casado and the President Allende Foundation v. Republic of Chile

Prepared two expert reports (January 2003, March 2003) on behalf of the Republic of Chile on the 1973 value of an expropriated newspaper company before the International Center for Settlement of Investment Disputes. Damages sought were US\$ 515 million. Our damages calculation was US\$ 7 million plus 5.8 percent interest. The tribunal found in favor of Claimant on liability and awarded US\$ 10 million plus 5 percent interest. Not called to provide oral evidence. Provided a third expert report (October 2008) regarding Claimant's Request for Revision. The damages award was subsequently annulled. Bilateral Investment Treaty Dispute, ICSID (engaged by respondent, expert and consultant).

Industry: Newspaper

Ceskoslovenska obchodni banka v. Slovak Republic

Assisted in the preparation of two expert reports (August 1999, October 2001) on accounting and valuation issues associated with the restructuring of the third largest bank in the Czech Republic and quantified the amounts owed to the bank by the Slovak Republic due to their participation in the restructuring. Expert reports were submitted to arbitral tribunal established under International Centre for the Settlement of Investment Disputes. Award issued (December 2004) in Claimant's favor for \$877 million in damages and costs. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, consultant only).

Industry: Financial Services

MTD Equity Sdn. Bhd. and MTD Chile S.A. v Republic of Chile

Advised the Ministry of Economy of the Republic of Chile regarding the proper amount due to the Claimant given the tribunal's award on the merits and quantum. Bilateral Investment Treaty Dispute, ICSID (engaged by Respondent, consultant).

Industry: Land Development

Invesmart v Czech Republic

Provided consulting services regarding the hypothetical restructuring and valuation of a Czech commercial bank that was the 5th largest in the country before it failed. Bilateral Investment Treaty Dispute, UNCITRAL (engaged by Respondent, consultant only).

Industry: Financial Services

RDEVCO, L.L.C. v Tanzania Electric Supply Company, Ltd.

NAVIGANT

Brent C. Kaczmarek, CFA

Providing consulting services regarding the alleged breach of a power offtake agreement for an emergency 100MW natural gas fired power project in Tanzania. Breach of Contract Dispute, ICC (engaged by Respondent, consultant only).

Industry: Electricity Production

United States of America v Government of Canada

Retained in a state to state arbitration to provide an expert report on the quantum of compensatory adjustments that should be paid due to a breach of a trade settlement agreement over softwood lumbers exports from Canada to the United States. Trade Dispute, LCIA (engaged by Claimant, consultant only).

Industry: Lumber Exports

Investor v European State

Finalized an expert report quantifying the impact of construction delays and incremental permit restrictions on the fair market value of a 1,700 MW coal-fired power plant. Prior to claimants' submission of its Memorial on the merits, the case was settled. Energy Charter Treaty Dispute, ICSID (engaged by Claimant, expert and consultant).

Industry: Electricity Production

North American Investor v South American State

Prepared a preliminary report on the fair market value of exploration property containing metallic resources. Bilateral Investment Treaty Dispute (engaged by claimant, expert and consultant).

Industry: Mining

Investor v South American Government

Provided expert and consulting services regarding the fair market value of a coffee roasting and distribution enterprise subject to alleged violations of a BIT. Bilateral Investment Treaty Dispute, ICSID (engaged by claimant, expert and consultant).

Industry: Retail

Asia Investor v South American State

Providing expert and consulting services regarding the value of metallic mine. Bilateral Investment Treaty Dispute (engaged by claimant, expert and consultant).

Industry: Mining

Investor v State

Providing expert and consulting services regarding affected investments in the pharmaceutical sector. North American Free Trade Agreement Chapter 11 Dispute, UNCITRAL (engaged by respondent, expert and consultant).

Industry: Pharmaceutical

Asian Investor v Asian State

Providing expert and consulting services regarding the value of a telecommunications enterprise. Bilateral

Investment Treaty Dispute (engaged by claimant, expert and consultant).

Industry: Telecom

Eastern Europe Investors v Eastern Europe State

Providing expert and consulting services regarding affected investments in the banking services sector. Bilateral Investment Treaty Dispute (engaged by claimants, expert and consultant).

Industry: Financial Services

CORFO v RWE Thames Water

Provided an analysis of the diminution in value of the shares of Essbio (the third largest water works company in Chile) on behalf of CORFO (the state business development agency in Chile) to resolve a shareholder dispute between CORFO and RWE Thames Water following an investigation into contract irregularities. The analysis indicated a loss of value to CORFO of at least US\$ 11.7 million. The arbitration was settled via a payment from RWE Thames Water for US\$ 11.1 million. Shareholder Agreement Dispute (engaged by Claimant, consultant).

Industry: Water

Slovakia Bankruptcy Proceeding

Prepared a loan valuation report (January 2000) on behalf of Ceskoslovenska obchodni banka for a bankruptcy court in Slovakia to quantify a bank's claims against its insolvent client. Breach of Contract (engaged by claimant, consultant).

Industry: Financial Services

Government of Guatemala

Provided valuation expertise, due diligence support and bid package construction in the 1997 privatization of the national phone company in Guatemala – Guatel. Privatization (engaged as consultant).

Industry: Telecom

Ministry of Finance Guarantee

Reviewed and verified an Eastern European bank's loan accounting for a defaulted loan. The review was used as the basis for the issuance of an amended sovereign guarantee over the loan. The original guarantee was required by a strategic foreign investor seeking to purchase the government's majority shareholding in the bank. Post-privatization Assistance (engaged as consultant).

Industry: Financial Services

Expert Engagements in US Litigation or Arbitration

Mr. Kaczmarek has served as financial expert and consultant in the following US litigations and/or arbitrations:

Tiffany & Company and Tiffany (NJ) LLC v Costco Wholesale Corporation

Prepared an expert report (November 2013) quantifying the economic benefits enjoyed by defendant for its use of the Tiffany name in marketing and selling engagement rings. Deposed in November 2013

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Brent C. Kaczmarek, CFA

(Trademark Infringement).

Industry: Retail

Hex Partners, et al. v. Mason N. Carter, Edward H. Cohen, Fernando L. Fernandez, Joel H. Goldberg, Ludwig, G. Kuttner, Timothy P. McCann, Arthur A. Oliner, Harold A. Raveche, Merrimac Industries, Inc., and Crane Co.

Prepared an expert report (September 2012) regarding the comparability of a bid and indication of interest to acquire a public company. Deposition taken in 2012. Case settled shortly thereafter. Breach of Fiduciary Duty, Superior Court of New Jersey (engaged by defendants, expert and consultant).

Industry: M&A

Chevron Corporation v. Stephen Donziger, et. al.

Prepared an expert report (July 2011) on the history of the oil industry in the Republic of Ecuador and proportion of value the Republic of Ecuador reaped from the first oil find. Deposition not taken. RICO, Southern District of New York (engaged by plaintiff, expert and consultant).

Industry: Oil Services

Metamor Worldwide v. Peter Noce, et al.

Submitted an expert valuation report on the fair market value of a content website, eBusiness consulting firm and telecommunications consulting firm. Deposition taken in 2000. Breach of Contract, Eastern District of Virginia (engaged by defendant, expert and consultant).

Industry: Internet

Columbia/HCA v. Texas Workers Compensation Commission

Provided expert testimony on the amount of unpaid workers compensation claims for fifty hospitals over 6 years after a legislative change to the reimbursement formula for providers was subsequently determined to be unconstitutional. Deposition taken in 2000. Breach of Contract, Eastern District of Texas (engaged by plaintiff, expert and consultant).

Industry: Labor

Consulting Engagements in Domestic Litigation

Mr. Kaczmarek has served as a financial consultant in the following US litigations and/or domestic arbitrations:

GTE v Worldcom

Evaluated and quantified the cost synergies for the planned merger of the second and third largest U.S. long-distance providers in an attempt to prove the merger would not result in lower prices for consumers. Antitrust Claim (engaged by claimant).

Industry: Telecom

Internet Backbone Transaction

Helped rebut a multi-million dollar claim for lost business value in a dispute related to the divestiture, sale

Confidential and Proprietary

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and transfer of a large internet backbone. Post-Acquisition Dispute (engaged by defendant).

Industry: Internet

Water Utility Investment Analysis

Valued several interest rate swaps and assessed the cash flow impact of selling those swaps for a Southern California Water District to rebut claims by the water district that advice given by an investment bank constituted a breach of fiduciary duty. Breach of Fiduciary Duty (engaged by defendant).

Industry: Financial Services

Investment Pool Analysis

Performed duration calculations on several exotic fixed income securities to measure the risk and leverage factors for a large Southern California County investment pool. The analysis was used to demonstrate the imprudent management of the pool by the fund manager. Breach of Fiduciary Duty (engaged by defendant).

Industry: Financial Services

CSU, et al v. Xerox

Analyzed the claims of more than 2 dozen independent service organizations against Xerox for monopolizing the service market of high speed copiers and printers by controlling the distribution of replacement parts. The case is often cited as a landmark case in intellectual property rights v. antitrust behavior. Antitrust Claim (engaged by defendant).

Industry: Retail

Xerox v. CSU

Developed an expert report on damages suffered by Xerox for patent infringement against replacement parts, trade secret violations for password and theft, and copyright infringement for software and user manual theft and reproduction. Intellectual Property Dispute (engaged by claimant).

Industry: Retail

Plaintiff v. Senior PGA Tour

Prepared an expert report on behalf of the Senior PGA TOUR to a Federal Court that defined the relevant market for senior professional golfers and refuted allegations by a player that the rules and practices of the TOUR were anticompetitive. Antitrust Claim (engaged by defendant).

Industry: Sports

Columbia Central Florida Laboratory v. Winter Park Healthcare Group

Supported a Florida hospital in defense of a breach of contract dispute regarding the termination of outpatient laboratory billing contracts. Breach of Contract (engaged by defendant).

Industry: Healthcare

Diesel Engine Manufacturer Dispute

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Brent C. Kaczmarek, CFA

Conducting cost accounting analysis to assist a U.S. diesel engine manufacturer refute allegations that its sales prices were predatory in the Southern California market. Predatory Pricing Claim.

Industry: Manufacturing

Gedeon Wales, et al. v. Jack M. Berry, Inc.

Reviewed the accounting records for more than 500 migrant workers and prepared an analysis and expert report on the underpayment of wages and bonuses to those workers over three harvest seasons. Breach of Contract (engaged by claimants).

Industry: Labor

Electronics Dispute

Analyzed and defined the relevant product market for a global manufacturer of polymeric-positive temperature coefficient devices to refute allegations of anti-competitive behavior. Antitrust Claim (engaged by defendant).

Industry: Manufacturing

Investigations

Anti-Money Laundering Investigation

Recovered millions of transactions in deposit, trust and securities accounts for Embassy and international banking clients of a troubled Washington D.C. bank and evaluated those accounts and transactions for suspicious activity as required by a consent order issued by the Office of the Comptroller of the Currency. Violations of AML and BSA Regulations.

Industry: Financial Services

DOJ / OIG Investigation

Assisted Columbia/HCA, an owner of more than 300 acute care hospitals in the US, develop strategies, quantify exposure, and negotiate settlements regarding Medicare and other governmental program claims of fraud brought by the Department of Justice, Office of Inspector General and the Department of Health & Human Services. Medicare and other Federal Health Program Fraud (engaged by defendant)

Industry: Healthcare

DOJ / DEA Investigation

Developed financial models and forecasts for a national institutional pharmacy company to help assess bankruptcy risk and successfully negotiated a federal fine on behalf of the company for DEA violations stemming from improper oversight of narcotics inventories. Narcotics Inventory Violations.

Industry: Pharmaceutical

Medicare Cost Report Review

Reviewed aspects of the reimbursement received by more than 300 hospitals over 5 years in an effort to resolve how much money CMS owed the hospital system due to delayed audits pending a fraud review.

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Brent C. Kaczmarek, CFA

Medicare Reimbursement Assessment (engaged by claimant).

Industry: Healthcare

Puerto Rico Department of Health

Evaluated the enrollment policies and procedures of the Puerto Rico Medicaid office and investigated more than 500,000 Medicaid beneficiaries applications for fraud. The review found that more than 100,000 beneficiaries were fraudulently receiving services. Those beneficiaries were removed from the program saving the DOH millions of dollars in monthly premiums. Fraud Investigation (engaged by claimant).

Industry: Healthcare

Health Plan Revenue Recovery

Developed and executed a methodology to assist more than a dozen Health Maintenance Organizations recover years of unpaid premiums (total recoveries exceed more than \$120 million to-date) from the Federal Employee Health Benefits Program. Findings led to a contractual revisions between all health plans participating in the program. Underpayment Analysis (engaged by claimants).

Industry: Healthcare

Medicare Reimbursement Reviews

Reviewed low-income patient statistics for more than 30 Puerto Rico hospitals to determine if the hospitals had been properly reimbursed by Medicare. Reviews led to more than \$15 million in additional revenue recoveries. Revenue Assessment (engaged by claimants).

Industry: Healthcare

Medical Device Manufacturer

Assisted an international medical device and software company perform an internal review of its implementation services for intensive care monitoring devices by independently reviewing the facts surrounding the failed implementation. Failed Technology Implementation.

Industry: Healthcare

Loan Review

Performed a financial review of a \$12 million dollar loan portfolio for a regional bank accusing its contracted service agent of improperly disposing of loan assets and other fraudulent activities. Fraud Investigation.

Industry: Financial Services

Real Estate Partnership Review

Assisted a Texas law firm in uncovering fraudulent activities of several wealthy Mexican investors that siphoned millions of dollars from the limited partners of a real estate partnership. Fraud Investigation.

Industry: Financial Services

Other Management Consulting Assignments

Provided troubled company and turn-around management consulting to a global manufacturer of co-generation plants and valve and fitting devices and successfully secured critical financing needed to avoid bankruptcy.

Provided advice to a national trade association in valuing an internet software division and assisted management in making strategic decisions regarding the future of the division.

Developed a management reporting system to help two large hospitals reduce operating costs and improve profitability.

Prepared a statistical sampling plan to be used annually in determining both profitability and taxable income for a trade association with for-profit and non-profit activities.

Assisted the nation's largest long-distance telecommunications company in analyzing and streamlining departmental functions within the environmental health and safety division.

Identified and measured an appropriate cost base to calculate landing fees at a major U.S. international airport.

Conducted annual surveys of lodging rates for the General Services Administration in more than 500 markets nationwide to determine the appropriate rates to reimburse government employees traveling on official business such that a sufficient level of room supply is available each night to meet overall demand.

Speaking Engagements

Dealing with Damages in International Arbitration: International Bar Association – Panelist in a mock arbitration about dealing with damages issues – October 2011.

Damages in ICSID Arbitrations – Prepared a presentation to the ICSID Secretary and senior counsel on ideas the institute could undertake to improve how damages are dealt with in ICSID arbitrations – February 2010

Asia Pacific Economic Communities: Workshop on Investor-State Arbitration – Panelist discussing methods of approaching compensation and damages – November 2008.

Damages in International Arbitration: Strategies, Techniques & Presentation – 19th Annual ITA Workshop organized by the Institute for Transnational Arbitration and the Center for American and International Law – June 2008.

Remedies in Commercial, Investment and Energy Arbitrations – Panelist at the Conference sponsored by the University of Texas School of Law, the Permanent Court of Arbitration, and the Houston Arbitration Club – April 2008.

The Role of the Quantum Expert in International Arbitration – Guest lecturer at Georgetown University Law School – December 2006 and November 2007

Applying the Unity of the Investment Principle to Determine Compensation for Complex Investments - International Bar Association, Investment Treaty Workshop – September 2006

Compensation for Non-Expropriatory Treaty Violations: An Analytical Framework - International Investment Law at a Crossroads, Harvard Law School – March 2006

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Quantum Matters in International Investment Arbitration, The Hague, Netherlands – June 2005

Medicare's Improper Application of Section 1886 of the Social Security Act Pertaining to Puerto Rico Hospitals, Simposio Anual Del Sector Salud de Puerto Rico, March 2005

Valuing International Investments, Washington DC Bar Association – October 2004

Technical Competencies

Proficient in relational database packages such as MS SQL Server, Microsoft Access, FoxPro, and Paradox.

Proficient in data mart or cube technologies such as QueryObject Systems and Microsoft OLAP Services.

Familiar with object oriented programming languages including VBA and PAL. Also familiar with VB 6.0 and C++, HTML

Work History

Navigant Consulting, Inc.	2002 - Present
Arthur Andersen LLP	1998 - 2002
LECG, Inc.	1997 - 1998
Arthur Andersen LLP	1993 - 1997

Professional Credentials & Memberships

Chartered Financial Analyst	September 1998 - Present
CFA Institute, Member; Washington Society of Investment Analysts, Member	April 1997 - Present

Education

Bachelors of Science in Commerce; Concentration in Finance	University of Virginia June 1993
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NAVIGANT

Garrett W. Rush, MBA, CFA

Managing Director

Valuation Expert Witness | International Arbitration

garrett.rush@navigant.com

Direct: 202.481.7345

Professional Summary

Garrett Rush is a Managing Director in the International Arbitration Group within the Disputes & Investigative Division at Navigant. Garrett advises clients and provides expertise on issues involving business and investment valuation, finance, strategy, and economics in industries such as telecommunications, electricity, mining, oil & gas, insurance, healthcare, and luxury goods. Garrett has been appointed as an expert and consultant in matters ICSID and ICC disputes.

Garrett received an MBA from INSEAD in Fontainebleau, France as well as the internationally recognized designation of Chartered Financial Analyst (CFA) from the CFA Institute.

Professional Experience

Mr. Rush has served as an expert and/or consultant in the following matters:

- PJSC Ukrnafta v. The Russian Federation; (*Bilateral Investment Treaty Dispute, ICSID*); Prepared an expert report (January 2016) addressing the alleged damages and fair market value of a network of petrol stations in Crimea. (Engaged by claimant as a consultant.)
- Stabil LLC et al. v. The Russian Federation; (*Bilateral Investment Treaty Dispute, ICSID*); Prepared an expert report (January 2016) addressing the alleged damages and fair market value of a network of petrol stations and storage facilities in Crimea. (Engaged by claimant as a consultant.)
- B3 Croatian Courier Coöpertief U.A. v. Republic of Croatia; (*Bilateral Investment Treaty Dispute*); Prepared an expert report quantifying the losses resulting from alleged anticompetitive acts leading up to and following the liberalization of the Croatian postal market. (Engaged by claimant as expert and consultant.)
- Allied Nevada Gold Corp., et al. in Chapter 11 Bankruptcy; (*U.S. Bankruptcy Court for the District of Delaware*); Appointed as financial advisor and valuation expert for the official committee of equity security holders. Created and analyzed multiple mine development scenarios to support a settlement involving the issuance of new warrants in the reorganized business.
- Del Monte GMBH v. Inversiones Y Procesadora Tropical, S.A.; (*ICC Dispute*); Prepared two expert reports (July 2015 and September 2015) critiquing claimant's loss quantification and quantifying the counter-claimed losses related to pricing of fresh pineapples exported from Costa Rica. (Engaged by respondent/counter-claimant as expert and consultant.)
- Pipe Viper LLC v. Pipe Viper International Ltd. & Automatic Coating Limited; (*ICDR Dispute*); Prepared an expert report (July 2015) quantifying the value of investments in intellectual property related to oil & gas pipeline stripping equipment used in the North American market. (Engaged by respondent/counter-claimant as expert and consultant.)

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Garrett W. Rush, MBA, CFA

Managing Director

- Transban Investments Corp. v. Bolivarian Republic of Venezuela: (Bilateral Investment Treaty Dispute); Prepared an expert report (February 2015) quantifying the fair market value of the exclusive importer and distributor of BMW cars into Venezuela. (Engaged by claimant as expert and consultant.)
- EULEN, S.A., a Spanish sociedad anonima, et. al., v. Jose C. Lorenzo, an individual, et. al., (ICC Arbitration) Prepared an expert report to analyze damages for a post-acquisition dispute involving an airport services company and allegations of fraudulent omissions of material liabilities by the former owners that resulted in alleged damaged reputation and diminution in value. (Engaged by respondent.)
- Greymouth Holdings Limited v. JET Trustees Limited: Prepared two expert reports and served as an expert in mediation meetings to conclude the fair market value of an integrated oil and gas exploration company in New Zealand as part of arbitration ordered by the New Zealand High Court (March 2014). (Engaged by claimant.)
- Tiffany & Co. and Tiffany (NJ) LLC v. Costco Wholesale Corporation: (U.S. District Court Southern District of New York); Prepared an expert report and declaration providing an assessment of the economic benefits Costco Wholesale Corporation gained by falsely identifying certain diamond rings it was selling accompanied by a sign bearing the Tiffany name. (Engaged by plaintiff.)
- Karkey Karadeniz Elektrik Uretim A.S. v The Islamic Republic of Pakistan: (Bilateral Investment Treaty Dispute); Prepared an expert report (January 2014) value of two powerships and other losses suffered by claimant as a result of the cancellation of a rental power project and the detention of two powerships and two support vessels in the Port of Karachi. (Engaged by claimant.)
- Agility for Public Warehousing Company K.S.C. v The Islamic Republic of Pakistan: (Bilateral Investment Treaty Dispute); Consultant and project manager in preparation of an expert report (August 2013) calculating the losses, including the fair market value of a customs processing enterprise, that was cancelled by respondent. (Engaged by claimant.)
- Rusoro Mining Limited v Bolivarian Republic of Venezuela: (Bilateral Investment Treaty Dispute, ICSID AF); Managed project team in preparation of an expert report (March 2013) to determine the fair market value of various operating and exploration gold mining properties in the Bolivar state of Venezuela and other losses suffered as a consequence of alleged breaches of a BIT and the nationalization of the production gold mines and exploration stage properties. (Engaged by claimant.)
- E.D.F. International v Republic of Hungary: (Energy Charter Treaty Dispute, ICSID): Managed project team in preparation of expert report (October 2012) on the alleged damages suffered by a gas-fired power generator after its power purchase agreements were terminated as a result of a European Commission investigation. (Engaged by respondent.)
- The Swatch Group Ltd. & Tiffany Watch Company Ltd. V Tiffany and Company, Tiffany (NJ) Inc., and Tiffany & Co.: (Breach of Contract, Netherlands Arbitration Institute): Managed project team in preparation of expert reports (March 2012, August 2012) quantifying losses incurred by

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Garrett W. Rush, MBA, CFA

Managing Director

Respondents for alleged breaches of agreements to manufacture and distribute luxury watches (Engaged by respondent.)

- The Attorney General of the Turks & Caicos Islands v Salt Cay Devco Ltd., Salt Cay Estates Ltd., Salt Cay Golf Club Ltd., & SC Hotel Management Ltd.: (*Fraud and Bribery Claims, Supreme Court of Turks & Caicos*): Managed project team in preparing three expert reports (December 2011, March 2012, June 2012) quantifying losses claimed by both parties involving a hotel resort development project on Salt Cay island. (Engaged by respondents.)
- TECO Guatemala Holdings, LLC v Republic of Guatemala: (*DR-CAFTA Dispute*): Managed project team in preparing an expert report (September 2011) quantifying the impact of an altered regulatory framework on the value of the largest electricity distributor in Guatemala. (Engaged by claimant.)
- Gold Reserve Inc. v. Bolivarian Republic of Venezuela (Bilateral Investment Treaty Dispute, ICSID AF); Managed project team in preparing an expert report to determine the fair market value of two gold/copper mining properties in the Bolivar state of Venezuela. (Engaged by claimant.)
- Yukos Universal Limited v. Russian Federation (Energy Charter Treaty Dispute, UNCITRAL); Managed project team in preparing an expert report quantifying the loss claimant suffered from its investment in Yukos Oil Company OJSC and/or the merged YukosSibneft under various scenarios for alleged violations of the ECT by Russia. (Engaged by claimant.)
- Hulley Enterprises Limited v. Russian Federation (Energy Charter Treaty Dispute, UNCITRAL); Managed project team in preparing quantifying the loss claimant suffered from its investment in Yukos Oil Company OJSC and/or the merged YukosSibneft under various scenarios for alleged violations of the ECT by Russia. (Engaged by claimant.)
- Veteran Petroleum Limited v. Russian Federation (Energy Charter Treaty Dispute, UNCITRAL); Managed project team in preparing quantifying the loss claimant suffered from its investment in Yukos Oil Company OJSC and/or the merged YukosSibneft under various scenarios for alleged violations of the ECT by Russia. (Engaged by claimant.)
- Murphy Exploration and Production Company International v. Republic of Ecuador (Bilateral Investment Treaty Dispute, UNCITRAL); Managed project team in preparing four expert reports (March 2009, January 2010, September 2012, July 2014) quantifying the losses sustained by claimant due the passage of a law which significantly reduced the profitability of oil production activities in the Republic of Ecuador. (Engaged by claimant.)
- Individual Plaintiff v. Mutual Insurance Company: (Philadelphia Court of Common Pleas); Retained to provide expert report and testimony regarding financial strength and performance of Mutual Insurance Holding Company and its publicly traded subsidiary. (Engaged by plaintiff.)
- Electrabel S.A. v. Republic of Hungary: (*Energy Charter Treaty Dispute, ICSID*); Managed project team in preparing an expert report regarding the historical profitability of a regulated power generator in the Republic of Hungary. (Engaged by respondent.)
- Mercuria Energy Group Limited v. Republic of Poland: (*Energy Charter Treaty Dispute, Stockholm Chamber of Commerce*); Managed Project team in preparing an expert report quantifying the

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Garrett W. Rush, MBA, CFA

Managing Director

- damages suffered by one of the largest independent energy traders in the world as a result of the imposition of a fine on the Claimant's wholesale fuel business in Poland. (Engaged by claimant.)
- RDEVCO, L.L.C. v Tanzania Electric Supply Company, Ltd. (Breach of Contract Dispute, ICC): Provided consulting services regarding the alleged breach of a power offtake agreement for an emergency 100MW natural gas fired power project in Tanzania. (Engaged by respondent, consultant only.)
 - AES Summit Generation Limited and AES Tisza Erömu Kft v. Republic of Hungary: (Energy Charter Treaty Dispute); Managed project team in preparing an expert report on the financial performance of a regulated electric utility from its privatization in 1996 to 2007. (Engaged by respondent.)
 - Walter Bau AG v. Kingdom of Thailand: (Bi-lateral Investment Treaty Dispute); Managed project team in preparing an two expert reports and trial presentation on the losses allegedly suffered by a German investor on a build, operate, and transfer toll road project in a Thailand. (Engaged by respondent.)
 - FLAG Telecom v. VSNL: (ICC Arbitration; 2007) Managed the response to a \$406 million high profile claim in India. The matter involved the alleged blocking of access to the submarine cable landing station by the incumbent international telecom capacity provider.
 - GAMI Investments v. United Mexican States: (NAFTA Chapter 11 Dispute; 2003); Prepared expert valuation reports on behalf of a US investor to a NAFTA arbitral tribunal on the valuation of a minority stake in a company operating five sugar refineries in Mexico. (Engaged by claimant.)
 - Cable & Wireless v. Worldcom: (Post-Acquisition Dispute): Prepared report on a multi-million dollar claim for lost business value in a dispute related to the divestiture, sale and transfer of a U.S. internet backbone business. (Engaged by defendant.)
 - MCI WorldCom Communications, Inc. v. Electronic Data Systems Corporation, et al.: (Breach of Contract; American Arbitration Association; 2001); Prepared expert report in July 2001 rebutting the opinions of an economist and accountant regarding issues of damages and liability in a case involving an outsourcing contract valued at over \$6 billion. (Engaged by plaintiff.)
 - London Pacific Insolvency: Managed the acquisition process for over US\$2 billion worth of life and annuity business. Supported the National Organization of Life and Health Insurance Guarantee Associations with the solicitation and valuation of bids to assume the insolvent business.
 - Insurance Brokerage Investigation: Engaged by the board of a parent company to investigate and then restructure an insurance brokerage. Consulting identified accounting irregularities and significant control issues. Recommended and assisted with execution of significant downsizing and strategy to renegotiate arrangements with significant creditors.
 - Bankers Commercial Life Insolvency: Managed transition of insolvent Medicare supplement insurance company following Liquidation Order. Facilitated transition of business to United Teacher Associates Insurance Company (UTA) and later through New Era Life Insurance Company by developing monthly reporting structure of business.

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Garrett W. Rush, MBA, CFA

Managing Director

- Columbia/HCA - DOJ / OIG Investigation: (Medicare and other Federal Health Program Fraud; 1999); Assisted Columbia/HCA, an owner of more than 300 acute care hospitals in the US, develop analysis and strategies regarding Medicare and other governmental program claims of fraud brought by the Department of Justice, Office of Inspector General and the Department of Health & Human Services. Structured detailed analysis of historical Medicare cost reports over 6-month period. (Engaged by defendant.)
- Valuation related to Wrongful Death: Served as a consultant to assess lost earnings associated with a highly successful small business owner who died in a general aviation training accident. Assessed earnings history and competition for the franchise operation run by the decedent as well as customer concentration; also considered the proposed franchise expansion plans across the country. Rebutted the damages calculations of an academic economist.
- Valuation of Gaming Franchise: (U.S. Federal Court); Served as a consultant to critique damages related to the valuation of a virtual reality gaming franchise and the effects of a financing delay.

Other Consulting Assignments

- America Online Performance Analysis: Developed site traffic performance metrics and reporting structure to restate and analyze several years of performance in preparation for America Online's transition from a subscription revenue model to an advertising revenue model.
- Arthur Andersen Obstruction of Justice Defense: Led a team providing litigation support including forensic accounting and investigative services for counsel in response to the congressional, civil, SEC and criminal investigations and litigation.
- Strategic Planning: Managed team developing strategic value enhancement initiatives pre and post-acquisition by private equity firm. Post-acquisition initiatives targeted a doubling of equity value in two years through strategic repositioning, sales force effectiveness and corporate-wide cost cutting.
- Business Intelligence: Developed new metrics and reporting structure to assist major U.S. online media company transition to advertising model.
- Sales Force Effectiveness: Identified high-value strategic initiatives through company-wide and customer surveys for multi-national plastics manufacturer.
- Securing Venture Capital: Collaborated with REIT to develop cost-benefit analysis focusing on the value proposition to potential users of the web-based system.
- Business Plan Development: Developed and wrote commercialization and funding plan for low-cost sensor technology developed in the Ecole Polytechnique Federale de Lausanne (EPFL) in Lausanne, Switzerland.
- U.S. Potash Market Entry Analysis: Co-authored a report submitted to the Department of Justice related to the effects of Canadian market entry

NAVIGANT

Garrett W. Rush, MBA, CFA

Managing Director

Relevant Speaking Engagements

- "Resolution of Investor-State Disputes in the Oil and Gas Sector: Key Issues and Trends," AIPN-YN Event, Washington, D.C., January 2012.
- "Resolving Disputes in Asia," A Seminar Discussion, Squire Sanders, April 2012.
- "Long Term Care Insurance," National Organization of Life Health Guaranty Associations (NOLHGA)

Work History

Navigant Consulting	2002 - 2003 and 2007 - present
Blue Ridge Partners	2005 - 2007
Arthur Andersen LLP	1998 - 2002
Deloitte & Touche LLP	1998
Glassman Oliver Economic Consultants Inc.	1995 - 1998

Certifications, Memberships and Awards

Chartered Financial Analyst	September 2001 - Present
CFA Institute, Member; Washington Society of Investment Analysts, Member	September 2001 - Present
Board Member/Finance Committee Chair IDEA Public Charter School	May 2012 - Present

Education

Master of Business Administration	INSEAD, Fontainebleau, France
Bachelor of Science, Economics	The College of William & Mary in Virginia
Interim Study	University of St. Andrews & London School of Economics