

**EXPERT REPORT OF PROFESSOR JAMES DOW**

**8 November 2014**

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## **A. Introduction**

1. I am James Dow, Professor of Finance at London Business School. I have previously served as Research Dean, Chair of the Finance subject area, and Director of the Institute of Finance and Accounting at London Business School, as Professor of Economics and Head of Department at the European University Institute, as Assistant Professor of Economics at the University of Pennsylvania, and as Editor of the Review of Economic Studies. I have extensive experience in valuation, which I have taught at London Business School since 1989. I submitted expert evidence on behalf of the Russian Federation on issues of damages and valuation in the underlying arbitration proceedings at issue here. My current *curriculum vitae* is attached as Annex 1 to this Report.
2. Counsel for the Russian Federation have asked me to review the methodology used by the Tribunal to award Claimants over USD 50 billion in damages. In this Report, I have specifically been requested not to address all of the flaws in the Tribunal's methodology. Rather, I have been asked to focus only on those flaws (a) that departed in significant respects from the parties' submissions and as to which I was not afforded an opportunity to be heard, (b) that resulted in the awarding of damages that have no economic basis, and (c) that had a substantial impact on the amount of damages awarded. In order to provide the necessary background and context for my discussion of these flaws, I have in a few cases referred to matters as to which I did have an opportunity to be heard. In light of my instructions, I have expressly noted where my conclusions relate to a methodology that the Tribunal developed on its own and as to which I did not have an opportunity to express my views.
3. In preparing this report, I reviewed:
  - (a) The Final Awards issued by the Tribunal on 18 July 2014;
  - (b) the reports and related appendices submitted by Claimants' damages expert, Mr Brent Kaczmarek;
  - (c) the reports and related appendices that I submitted in response to his reports; and
  - (d) the relevant portions of the transcript of the merits hearing held in The Hague.
4. The damages awarded by the Tribunal had three components:

- (a) Claimants' interest in Yukos' hypothetical equity value on the date of the Final Awards;
- (b) Claimants' interest in the hypothetical dividends that Yukos would have paid up to the date of the Final Awards; and
- (c) pre-award interest on Yukos' hypothetical dividends.

This Report is principally concerned with the first two heads of damages – Yukos' hypothetical equity value and Yukos' hypothetical dividends.

5. The principal conclusions I reach are the following:

- (a) The Tribunal rejected Claimants' proposed valuation date and Claimants' valuation of Yukos.
- (b) The Tribunal also rejected outright two of the three damages models submitted by Mr Kaczmarek, and substantially agreed with my criticism of his third model.
- (c) As a result of the Tribunal's decision to value Yukos on the date of the Final Awards (deemed to be 30 June 2014) – a date on which neither side had previously valued Yukos – the Tribunal developed its own non-standard methodology for determining Yukos' hypothetical equity value and hypothetical dividends.
- (d) This methodology departed in significant respects from the methodologies proposed and discussed by the parties and their experts.
- (e) In the case of Yukos' dividends, the Tribunal's own non-standard methodology contradicts a basic economic principle (the inverse relationship between a company's dividends and the growth of its equity value) that both sides' experts accepted, and as a result effectively awarded the same amounts twice.
- (f) In the case of Yukos' equity value, the Tribunal's methodology was flawed in two respects. First, the equity value model used by the Tribunal depended on financial inputs generated by one of Mr Kaczmarek's models that was rejected by the Tribunal because it was not sufficiently reliable, and second, the

Tribunal adjusted these financial inputs in calculating Yukos' hypothetical dividends, but failed to make the same adjustments in its equity value model.

- (g) The methodology adopted by the Tribunal is flawed in fundamental respects, and resulted in the awarding to Claimants of not less than USD 21.651 billion of damages having no economic basis. Of this amount, USD 20.228 billion is attributable to the damages awarded to Claimants in respect of Yukos' hypothetical dividends and interest, and USD 1.422 billion to the damages awarded in respect of Yukos' hypothetical equity value.
- (h) The Tribunal also used Mr Kaczmarek's cash flow figures as its starting point in determining Yukos' hypothetical dividends, and then significantly adjusted his figures in determining the final amount of Yukos' dividends, but did not provide any reason for the size of its adjustments.
- (i) Neither Mr Kaczmarek nor I had the opportunity to comment on the damages methodology that the Tribunal developed on its own initiative.

6. The balance of this Report is organized into six sections. Section B describes the damages awarded by the Tribunal. Section C summarizes the views Mr Kaczmarek and I expressed in the reports we submitted to the Tribunal and at the merits hearing in The Hague. This is followed, in Section D, by a summary of the Tribunal's conclusions with respect to the views we expressed. Before discussing the Tribunal's own damages methodology, I offer several observations in Section E on the Tribunal's inappropriate exercise of its discretion in awarding Claimants very substantial damages on the basis of a non-standard methodology as to which neither Mr Kaczmarek nor I had an opportunity to be heard. The last two sections contain my substantive analysis of how the Tribunal's adoption of its own non-standard methodology departed in significant respects from the issues discussed in the parties' submissions, and led to the awarding of billions of dollars in damages that have no economic basis. In Section F, I focus on the flaws in the methodology developed by the Tribunal to determine the amount of Yukos' hypothetical dividends, and in Section G on the flaws in the methodology developed by the Tribunal to determine Yukos' hypothetical equity value.

## **B. Damages Awarded**

7. It will be helpful in understanding my Report if I first describe how the Tribunal calculated the damages it awarded.
8. According to the Tribunal, the damages it awarded were intended to put Claimants in the same (“but for”) position as they would have been in on the date of the Final Awards if their interests in Yukos had not been expropriated on 19 December 2004, subject to a downward adjustment for what the Tribunal found to be Claimants’ own contribution to the prejudice they suffered.
9. There are three components to the damages awarded by the Tribunal. The first component represents the Tribunal’s calculation of Claimants’ *pro rata* interest in Yukos’ “but for” equity value on 30 June 2014. The second component represents the “but for” dividends that the Tribunal found Claimants would have received on their hypothetical Yukos shares from 31 December 2004 through 30 June 2014.<sup>1</sup> The third component represents the “but for” interest that the Tribunal decided Claimants would have earned on the reinvestment of those dividends from the date of their assumed receipt to 30 June 2014. The Tribunal then reduced the sum of those amounts by 25% to take account of the Tribunal’s assessment of Claimants’ own contributory fault.
10. I briefly describe below the Tribunal’s findings with respect to each of these components, and then discuss the first two components in greater detail in Sections E and F.

### **(a) Yukos’ Equity Value**

The Tribunal found that Yukos’ “but for” equity value on 30 June 2014 would have been USD 42.625 billion in the absence of the Russian Federation’s actions.<sup>2</sup> The “equity value” of a firm typically reflects the price that a willing buyer could be expected to pay a willing seller for the equity of the firm as of a given date, and I understand that is how the Tribunal uses the term in the Final Awards. In determining Yukos’ equity value on 30 June 2014, the Tribunal first determined Yukos’ “but for” equity value on 21 November 2007 (referred to below as the

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<sup>1</sup> The Tribunal assumed that Yukos’ “but for” dividends would be paid on the last day of each year, beginning with 31 December 2004, and that pre-award interest would begin to accrue on those dividends on the first day of the following year. Final Awards ¶ 1818 n. 2422.

<sup>2</sup> Final Awards ¶ 1821.

company's 2007 equity value), and then adjusted that value to reflect the subsequent changes in the share prices of a group of Russian oil and gas companies that the Tribunal found to be comparable to Yukos.

(b) *Lost Dividends*

According to the Tribunal, had Claimants' interest in Yukos not been expropriated on 19 December 2004, Yukos would have paid USD 45 billion in dividends for the years 2004 to 2013 and the first half of 2014.<sup>3</sup>

(c) *Interest on Dividends*

The Tribunal concluded that it "would be appropriate" to award Claimants interest on their "but for" dividends at a rate of 3.389% per annum, representing the arithmetic average of the yields on the 10-year U.S. Treasury bond from 1 January 2005 to 30 May 2014.<sup>4</sup> The Tribunal then calculated that USD 6.981 billion of interest would have accrued at this rate on Yukos' "but for" dividends from 1 January 2005 to 30 June 2014.

(d) *Adjustment for Claimants' Shareholding and Contributory Fault*

Finally, the Tribunal adjusted the sum of items (a), (b) and (c) to reflect Claimants' roughly 70.5%<sup>5</sup> indirect ownership interest in Yukos, and then further reduced that amount by 25% to take account of its ruling "that the Claimants contributed to the extent of 25 percent to the prejudice they suffered."<sup>6</sup>

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<sup>3</sup> Final Awards ¶ 1812.

<sup>4</sup> Final Awards ¶ 1687.

<sup>5</sup> Paragraph 1822 of the Final Awards refers to "Claimants' 70.5 percent share in Yukos." The Tribunal in fact used Claimants' actual share ownership interest (70.4965947960625%) in calculating the damages it awarded.

<sup>6</sup> Final Awards ¶ 1827.

11. By way of summary, I set out below the principal steps in the Tribunal’s damages calculation:

(1)	Yukos’ “but for” equity value as of 21 November 2007	USD 61,075,800,000
(2)	The change (expressed as a ratio) in the index value of a group of comparable Russian oil and gas companies from 21 November 2007 (index value = 267.8) to 30 June 2014 (index value = 186.9)	0.697908887 = 186.9/267.8
(3)	Yukos’ “but for” equity value as of 30 June 2014	USD 42,625,343,615 = (1) x (2)
(4)	The “but for” dividends that the Tribunal assumed Yukos would have paid on the last day of each year (beginning with 31 December 2004) and on 30 June 2014	USD 45,000,000,000
(5)	The “but for” interest that the Tribunal assumed Claimants would have earned on those dividends from the first day following their deemed date of payment to 30 June 2014	USD 6,981,340,000
(6)	Claimants’ ownership interest in Yukos	70.4965947960625 %
(7)	Claimants’ pro rata share of (a) Yukos’ “but for” equity value as of 30 June 2014, <i>plus</i> (b) the “but for” dividends that Yukos would have paid from 1 January 2005 to 30 June 2014, <i>plus</i> (c) the “but for” interest that Claimants would have earned on those dividends to 30 June 2014	USD 66,694,490,398 = (6) x [(3) + (4) + (5)]
(8)	Claimants’ contributory fault	25 %
(9)	Total damages awarded	USD 50,020,867,798 = (7) – [(8) x (7)]

### C. Views Of The Parties' Damages Experts

12. In this Section I summarize the views expressed in the reports that Mr Kaczmarek and I submitted to the Tribunal and at the merits hearing held in The Hague.<sup>7</sup>

#### (a) Mr Kaczmarek's Models

13. Claimants requested compensation based on Yukos' hypothetical value on 21 November 2007, the date on which they asserted their investment was expropriated. Mr Kaczmarek proposed that Yukos' value be determined using three different valuation methods: a discounted cash flow ("DCF") model, a comparable companies model and a comparable transactions model.<sup>8</sup> The values produced by each of these models were based on inputs specific to 21 November 2007.

14. Mr Kaczmarek proposed that the three results be weighted according to their reliability, and that the overall value of Yukos be fixed at the weighted average of the values produced by the three valuation methods. Mr. Kaczmarek's models were thus part of a single composite valuation, and not "alternative valuations of Yukos,"<sup>9</sup> as the Tribunal characterized them. As Mr Kaczmarek explained, "the valuation practitioner should attempt to implement all three valuation approaches when feasible to do so. When the available data does not exist to perform one or more of the valuation methods, the valuation practitioner should identify the deficiencies and acknowledge that the approach could not be conducted in a manner that would yield a most reliable result."<sup>10</sup>

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<sup>7</sup> Mr Kaczmarek submitted two reports, each supported by numerous appendices and annexes. Expert Report of Brent C. Kaczmarek, CFA (15 September 2010); Second Expert Report of Brent C. Kaczmarek, CFA (15 March 2012). I also submitted two reports, each supported by appendices and annexes that generally reflected the adjustments I made to those submitted by Mr Kaczmarek. Expert Report of James Dow (1 April 2011); Second Expert Report of James Dow (15 August 2012).

<sup>8</sup> The Tribunal referred to eight different valuation methodologies (and related valuations) submitted by Claimants. Final Awards ¶¶ 1782, 1795. The Tribunal rejected five of the valuations because they "were introduced by Claimants at a very late stage of the proceedings (through demonstrative exhibits at the Hearing and in Claimants' Post-Hearing Brief) and therefore could not be properly addressed by Respondent." Final Awards ¶ 1795. Claimants submitted these valuations only as so-called "reasonableness checks" on their other valuations, and never sought compensation on the basis of any of their late-submitted valuations. Claimants' Post-Hearing Brief ¶¶ 261-262, 302; Claimants' Reply ¶ 1199(3).

<sup>9</sup> Final Awards ¶ 1782.

<sup>10</sup> First Kaczmarek Report ¶ 81.

15. Mr Kaczmarek weighted each of his three models based on his own views as to its reliability.<sup>11</sup> He assigned a 50% weight to his 2007 DCF model, a 40% weight to his comparable companies model, and a 10% weight to his comparable transactions model.<sup>12</sup> His 50% weighting of his 2007 DCF model thus represented his view that this model produced the most reliable result. As described below, the Tribunal rejected Mr Kaczmarek’s 2007 DCF model, and instead calculated Yukos’ 2007 “but for” equity value on the basis of his comparable companies model, and then brought that value forward to 30 June 2014 using a non-standard method developed by the Tribunal on its own initiative.

(i) Mr Kaczmarek’s DCF Models

16. Mr Kaczmarek explained that his 2007 DCF model assumed that “the value of a business or asset is equal to the future cash flows produced by the business, discounted to present value at a rate that reflects the risks of generating those cash flows.”<sup>13</sup> According to Mr Kaczmarek, his 2007 DCF model represented the value in 2007 of the future cash flows that a potential investor would have predicted would have been generated by Yukos after 2007. As the Tribunal recognized, his 2007 DCF model was necessarily “based on forecasts and projections built up from information available prior to the period.”<sup>14</sup>
17. In March 2012, Mr Kaczmarek submitted an updated version of his 2007 DCF model that purported to calculate Yukos’ equity value as of 1 January 2012. The principal change made in his 2012 DCF model was the replacement of some (but not all) of the forecasts previously included in his 2007 DCF model with historical information based on the subsequent performance of certain of Yukos’ former businesses under the ownership of Rosneft and GazpromNeft.<sup>15</sup> His 2012 DCF model, however, retained the same structure and adopted the same methodology as his 2007 DCF model.

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<sup>11</sup> First Kaczmarek Report ¶ 373.

<sup>12</sup> First Kaczmarek Report ¶ 21.

<sup>13</sup> First Kaczmarek Report ¶ 81.

<sup>14</sup> Final Awards ¶ 1793.

<sup>15</sup> Final Awards ¶ 1714. In my Second Report, I explained how Mr Kaczmarek’s use of non-Yukos data to determine Yukos’ “historical” performance led to results that were demonstrably incorrect. Second Dow Report ¶¶ 251-256.

(ii) Mr Kaczmarek's Comparable Transactions Model

18. Mr Kaczmarek stated that his “comparable transactions model” assumed that “[w]hen a company that is comparable to the subject company has recently been purchased, either partially or in total, the purchase price can be used to estimate the value of the subject company.”<sup>16</sup> To arrive at a value for Yukos based on this methodology, Mr Kaczmarek identified various corporate transactions that he asserted were similar to a partial sale of Yukos’ assets, and then derived a value for Yukos’ components based on the prices paid in those supposedly similar transactions.

(iii) Mr Kaczmarek's Comparable Companies Model

19. Mr Kaczmarek’s “comparable companies” model sought to derive Yukos’ 2007 equity value by calculating valuation “multiples” for other publicly traded companies that he considered to be comparable to Yukos. He then used those multiples to calculate Yukos’ value. For each of his chosen companies, Mr Kaczmarek identified four multiples, each based on an economic metric: (a) the ratio of the company’s enterprise value<sup>17</sup> to its earnings before interest, taxes, depreciation and amortization (“EBITDA”), (b) the ratio of the company’s market price to its earnings, (c) the ratio of the company’s enterprise value to its proven oil and gas reserves, and (d) the ratio of the company’s enterprise value to its oil and gas production.<sup>18</sup> For example, if Company A’s share price was two times its earnings per share, then Company A had an earnings multiple of 2.
20. After calculating the four multiples for each of the comparable companies, Mr Kaczmarek assigned a weight to each company, and calculated the weighted average of each multiple using each company’s assigned weight. This generated four separate multiples that he then used to calculate Yukos’ value, based on Yukos’ own economic metrics. For example, if Company A had a price-to-earnings multiple of 2 and was assigned a weight of 1, and Company B had a price-to-earnings multiple of 4 and was assigned a weight of 3, then Company A and B together had a weighted average price-to-earnings multiple of 3.5  $([2 \times 1] + [4 \times 3] \text{ divided by } [3 + 1])$ . Mr Kaczmarek then applied the four weighted

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<sup>16</sup> First Kaczmarek Report ¶ 90.

<sup>17</sup> A firm’s enterprise value is equal to its equity value plus its debt.

<sup>18</sup> First Kaczmarek Report ¶ 325.

average multiples to Yukos' own 2007 "but for" economic metrics (EBITDA, earnings, oil and gas reserves, and oil and gas production) to calculate four separate 2007 "but for" equity values for Yukos. Yukos' 2007 "but for" economic metrics were in each case generated by Mr Kaczmarek's 2007 DCF model. Finally, Mr Kaczmarek averaged his four results to arrive at an overall 2007 "but for" equity value for Yukos based on his comparable companies model.<sup>19</sup>

21. In addition to calculating Yukos' 2007 "but for" equity value, Mr Kaczmarek also calculated the "but for" dividends that, he claimed, Claimants would have received between 2004 and 20 November 2007 if their interest in the company had not been expropriated.<sup>20</sup> According to Mr Kaczmarek, these dividends would have been equal to Yukos' "free cash flow to equity" during this period, which he defined for each year as Yukos' net income, plus its depreciation, less its capital expenditure and the increase in its working capital, adjusted for the change in its net debt, for that year.<sup>21</sup> Using his 2007 DCF model Mr Kaczmarek calculated Yukos' total "but for" dividends for this period at USD 28.95 billion.<sup>22</sup>

(b) *My Criticism of Mr Kaczmarek's Models*

22. In my submissions to the Tribunal, I criticized Mr Kaczmarek's models on a number of different grounds.
23. In the case of his 2007 DCF model, I identified numerous errors that, when corrected, altered his valuation of Yukos by tens of billions of dollars, and noted that his DCF valuation was "artificially inflated by Mr Kaczmarek's selective and unsupported assumptions, many of which cannot be 'corrected.'"<sup>23</sup> I ultimately concluded that his DCF model was "so unnecessarily complicated as to be essentially a 'black box,' and therefore

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<sup>19</sup> First Kaczmarek Report ¶ 429.

<sup>20</sup> First Kaczmarek Report ¶ 232.

<sup>21</sup> First Kaczmarek Report ¶ 232.

<sup>22</sup> First Kaczmarek Report ¶ 374.

<sup>23</sup> Second Dow Report ¶ 316.

unchecked by common sense, and shows signs of potentially having been reverse-engineered.”<sup>24</sup>

24. In the case of his comparable transactions model, I noted that there were in fact no comparable transactions in the relevant period.<sup>25</sup>
25. Finally, I identified a number of significant problems with Mr Kaczmarek’s comparable companies model. In particular, I noted that Mr Kaczmarek had assigned a 70% weighting to the “multiples” he derived from Rosneft Oil Company. This was problematic because Rosneft was a majority-owned state enterprise of strategic significance to the Russian Federation, and Yukos was not. I stated in my Second Report: “the market perceives Rosneft as having higher value by virtue of being majority state-owned and that oil development assets are accordingly valued more in the hands of Rosneft than they are in the hands of other Russian oil companies.”<sup>26</sup>
26. In my Second Report, I also illustrated the nature and magnitude of the problems with Mr Kaczmarek’s comparable companies model by highlighting several obvious flaws. In particular, I showed that Mr Kaczmarek’s calculation of Yukos’ “but for” 2007 equity value would have been reduced by nearly 32%, or approximately USD 31.7 billion,<sup>27</sup> if only two changes were made to his model – Rosneft and the major international oil companies were excluded, and equal weights were assigned to the remaining comparable companies.
27. I explained that my purpose in calling the Tribunal’s attention to some of the more obvious defects in Mr Kaczmarek’s comparable companies model was to demonstrate that this model should *not* be used to calculate Claimants’ damages:

“Mr Kaczmarek’s models are so badly designed and so riddled with errors and inconsistent, weakly supported, or totally unsupported assumptions that it is not realistic for me to fully correct his model. Rather, the purpose of making such

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<sup>24</sup> Second Dow Report ¶ 317.

<sup>25</sup> Second Dow Report ¶ 420.

<sup>26</sup> Second Dow Report ¶ 401.

<sup>27</sup> Second Dow Report ¶ 417.

revisions is to illustrate the extent to which Mr Kaczmarek's analysis is unreliable and to indicate by order of magnitude the extent of his errors."<sup>28</sup>

28. I also called the Tribunal's attention to a further problem with Mr Kaczmarek's comparable companies model. I noted in my Second Report (as had Mr Kaczmarek in his First Report)<sup>29</sup> that his comparable companies model was not an independent valuation method, as all of its principal inputs were taken from his DCF model. As a result, even if all of the "comparability" problems with Mr Kaczmarek's comparable companies model were corrected, it would still be unavoidably dependent on the erroneous financial outputs (i.e., Yukos' earnings and EBITDA) produced by his DCF model.
29. I did not, however, correct his comparable companies model for its use of the erroneous outputs of his DCF model. As I stated in my Second Report:
- "to illustrate the magnitude of the errors [Mr Kaczmarek] commits here – independent of the errors he commits in his DCF valuation of Yukos – I do not correct the inputs from his DCF analysis into his comparable companies."<sup>30</sup>
30. I also did not put forward my own estimate for the value of Yukos using a comparable companies method, based on corrections to his model. My reason for not doing so was that I considered 21 November 2007 to be an inappropriate valuation date.<sup>31</sup> To provide a valuation as of another date would have required me to develop a new comparable companies model, with comparable company inputs from a different date. This would have been a significant and speculative undertaking, because the Tribunal had not yet provided any guidance as to what it thought to be the appropriate valuation date.<sup>32</sup>

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<sup>28</sup> Second Dow Report ¶ 7 (emphasis supplied).

<sup>29</sup> First Kaczmarek Report ¶ 429.

<sup>30</sup> Second Dow Report ¶ 395 (emphasis supplied). I also made this point in Note 10 to Appendix 16.1 to my Second Report.

<sup>31</sup> First Dow Report Section 2.4

<sup>32</sup> At the hearing, I testified that that the appropriate valuation date could not be "after the end of 2004." Dow Testimony, Hr'g Tr. Day 12, 49:10-11. This did not, however, significantly limit the number of valuation dates that I regarded as potentially relevant. First Dow Report ¶¶ 28-33. In its submissions, the Russian Federation identified at least 22 different dates *prior* to the December 19, 2004 valuation date ultimately adopted by the Tribunal that were potentially relevant for assessing Claimants' possible damages.

**D. The Tribunal’s Conclusions With Respect To The Views Expressed By The Parties’ Damages Experts**

31. The Tribunal’s findings with respect to the serious defects in Mr Kaczmarek’s models largely tracked my views. The Tribunal nonetheless relied on these models (as modified by the Tribunal in unexpected ways) to award Claimants very substantial damages that are economically unwarranted. As I discuss below, in attempting to address the defects in Mr Kaczmarek’s models, the Tribunal developed its own flawed non-standard methodology, without affording Mr Kaczmarek or me an opportunity to be heard.

(a) *Mr Kaczmarek’s DCF Models*

32. The Tribunal agreed with my criticism of Mr Kaczmarek’s 2007 DCF model, observing that it was “persuaded by Professor Dow’s analysis of Claimants’ DCF model, and is compelled to agree that little weight should be given to it.”<sup>33</sup> The Tribunal also specifically recognized that “Claimants’ expert admitted at the hearing that his DCF analysis had been influenced by his own pre-determined notions as to what would be an appropriate result,”<sup>34</sup> or in other words, had been reverse engineered. On that basis, the Tribunal found that Mr Kaczmarek’s 2007 DCF model was not “sufficiently reliable to ground a determination of damages for this case,”<sup>35</sup> and rejected the use of this model – the one presented by Mr Kaczmarek as the most reliable of his three models – to calculate Claimants’ damages.

33. The Tribunal found Mr Kaczmarek’s 2012 DCF model to be similarly flawed. This model, prepared by Mr Kaczmarek “for comparison purposes” only, did not differ from his 2007 DCF model in terms of its structure or methodology, and thus suffered from the same defects that led the Tribunal to reject his 2007 DCF model. The Tribunal agreed, observing with respect to the cash flows produced by this model that it was “unable to dissociate them from Claimants’ DCF model, which was convincingly criticized by Respondent’s expert and its counsel.”<sup>36</sup>

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<sup>33</sup> Final Awards ¶ 1785.

<sup>34</sup> Final Awards ¶ 1785.

<sup>35</sup> Final Awards ¶ 1785.

<sup>36</sup> Final Awards ¶ 1799.

(b) *Mr Kaczmarek's Comparable Transactions Model*

34. The Tribunal also rejected Mr Kaczmarek's comparable transactions model, finding that it could "put little stock in Claimants' calculations based on the comparable transactions method, since both Parties agree that, in fact, there were no comparable transactions, and thus no basis that would allow a useful comparison."<sup>37</sup>

(c) *Mr Kaczmarek's Comparable Companies Model*

35. Having rejected Claimants' other methods, the Tribunal was left only with Mr Kaczmarek's comparable companies model, to which Mr Kaczmarek had assigned only a 40% reliability weighting.
36. The Tribunal also agreed with my criticism of Mr Kaczmarek's comparable companies model for having included State-owned Rosneft in its universe of comparable companies, observing that "Mr Kaczmarek effectively valued Yukos as if it were a State-owned strategic enterprise, which it never was."<sup>38</sup> The Tribunal likewise accepted my other illustrative corrections to this model's "comparability" assumptions, for example, those related to its valuation "multiples," by excluding the State-owned and non-Russian companies and giving equal weight to the remaining companies. The Tribunal nonetheless stated that it did "have a measure of confidence in the comparable companies method,"<sup>39</sup> and used this method as the sole basis for finding Yukos' 2007 "but for" equity value.
37. Even though I had clearly indicated that the "comparability" corrections I had made to Mr Kaczmarek's comparable companies model were intended only to illustrate the unreliability of his model, and that the figure resulting from my corrections did *not* represent my own view as to Yukos' 2007 "but for" equity value, the Tribunal adopted my figure as "the best available estimate" of Yukos' 2007 "but for" equity value.<sup>40</sup> I regard this figure to be an incorrect estimate of Yukos' 2007 "but for" equity value, and the Tribunal's decision to use this figure to value Yukos to be unjustified. These matters are discussed further at paragraphs 98 to 103 below.

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<sup>37</sup> Final Awards ¶ 1785.

<sup>38</sup> Final Awards ¶ 1804.

<sup>39</sup> Final Awards ¶ 1787.

<sup>40</sup> Final Awards ¶ 1784.

38. To summarize, the Tribunal did not accept either Mr Kaczmarek’s determination of Yukos’ 2007 “but for” equity value or his proposed three-model approach to calculating that value. The Tribunal instead adopted its own non-standard valuation methodology that departed in significant respects from the parties’ submissions. The Tribunal’s methodology was based on (a) Mr Kaczmarek’s comparable companies model, even though that model depended on inputs from the same 2007 DCF model that the Tribunal rejected as a basis for determining Claimants’ damages, and (b) a figure I presented solely to illustrate why his comparable companies model should *not* be used to determine Yukos’ “but for” equity value.

(d) *Valuation Date*

39. The Tribunal also rejected both of the valuation dates used in Mr Kaczmarek’s models, and developed its own method to determine Yukos “but for” equity value on the Tribunal’s valuation dates.<sup>41</sup> All but one of Mr Kaczmarek’s models assumed that Claimants’ interest in Yukos was expropriated on 21 November 2007, and valued Yukos as of that date. The single exception was his 2012 DCF model, which used 1 January 2012 as the valuation date, which the Tribunal also rejected.<sup>42</sup>
40. In rejecting 21 November 2007 as both the date of Yukos’ expropriation and the date to be used in valuing Yukos, the Tribunal agreed “with Respondent that the date of 21 November 2007 cannot be the date of Yukos’ expropriation,” and instead fixed 19 December 2004 as the date of Claimants’ loss.<sup>43</sup> The Tribunal also held that Claimants were “entitled to select either the date of expropriation or the date of the awards as the date of valuation,” whichever leads “to the higher of the damages determined.”<sup>44</sup>
41. Neither Mr Kaczmarek nor I put forward a valuation of Yukos as of 19 December 2004 or as of the date of the Final Awards (30 June 2014), and neither of those dates was considered at the hearing. In the Final Awards, the Tribunal arrived at a “but for” equity value for Yukos as of 19 December 2004 and 30 June 2014, by adjusting Yukos’ 2007 “but

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<sup>41</sup> Final Awards ¶ 1759-1762.

<sup>42</sup> Second Kaczmarek Report ¶ 155.

<sup>43</sup> Final Awards ¶ 1760-1762.

<sup>44</sup> Final Awards ¶ 1777.

for” equity value to reflect the changes (forward and backward in time) in the RTS Oil & Gas Index (“RTS Index”), which the Tribunal found to be a reliable indicator of the performance in this period of a group of comparable Russian oil and gas companies. Unlike Mr Kaczmarek’s comparable companies model, which assumed that Yukos was comparable to its peer firms at a single point in time, using the RTS Index to adjust Yukos’ “but for” equity value over time assumes that Yukos’ year-to-year performance was comparable to that of the companies in the RTS Index. As discussed in Section E, this assumption has very important consequences for the Tribunal’s determination of the amount of Yukos’ “but for” dividends.

42. The Tribunal’s approach to valuing Yukos is non-standard, and I consider it to be inaccurate because it first values a hypothetical Yukos on an arbitrary date (which is what the Tribunal found 21 November 2007 to be) and then adjusts that value over time to arrive at a value for Yukos on the Tribunal’s own valuation dates. It would have been preferable for the Tribunal to have instead asked Mr Kaczmarek and me to value Yukos as of 19 December 2004 and 30 June 2014. Both Mr Kaczmarek and I suggested doing so if the Tribunal concluded that 19 December 2004 and the date of the Final Awards were the relevant valuation dates. In my First Report, I indicated that “the Tribunal’s ruling on what is or is not a treaty violation is a necessary prerequisite to a damages calculation,”<sup>45</sup> and Mr Kaczmarek offered in his Second Report to update his valuation of Yukos “at a date closer to the hearing or the Award.”<sup>46</sup> It would have been possible for us to value Yukos as of the dates chosen by the Tribunal, using standard methods.
43. In my First Report, I observed that using an arbitrary date after the alleged treaty violations to value Yukos carries with it the significant risk of “large and seemingly arbitrary variations in the calculated damages relative to the harm suffered at the time of the alleged violations.”<sup>47</sup> The Tribunal’s approach illustrates this problem. Using a different date than 30 June 2014 in its methodology can result in massive swings in value. For example, using the Tribunal’s methodology but applying the RTS Index’s closing value on 5 November

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<sup>45</sup> First Dow Report ¶¶ 21, 28-33.

<sup>46</sup> Second Kaczmarek Report ¶ 155.

<sup>47</sup> First Dow Report ¶ 31.

2014 yields a “but for” equity value for Yukos of approximately USD 36.5 billion,<sup>48</sup> which is over USD 6 billion less than the “but for” value the Tribunal determined as of 30 June 2014.<sup>49</sup>

44. The Tribunal appears to have tried to moderate the impact of these arbitrary swings in value by using – for its equity valuation as of 30 June 2014 but not for its equity valuation as of 19 December 2004 or its base index value for 21 November 2007 – a six-month average of RTS Index closing values.<sup>50</sup> I see no economic rationale for choosing a six-month average instead of some other period, much less for using the average in only one element of the Tribunal’s calculations, and the Tribunal provided none. In any event, even using the average of RTS Index closing values for the six months preceding 5 November 2014 yields a “but for” equity value of close to a billion dollars less than the Tribunal determined as of 30 June 2014.<sup>51</sup>

(e) *Yukos’ “But For” Dividends*

45. The Tribunal also developed its own methodology for calculating Yukos’ post-2007 “but for” dividends. This was made necessary, in part, by the Tribunal’s rejection of 21 November 2007 as the valuation date. After finding that Yukos was expropriated on 19 December 2004 and that Claimants’ damages should be determined as of 30 June 2014 (the date of the Final Awards) in a “but for” world in which Claimants continued to own their Yukos shares over the intervening decade, the Tribunal concluded that it was necessary to fix the amount of Yukos’ “but for” dividends for each year from 2004 to 2014. Because all but one of Mr Kaczmarek’s models calculated Claimant’s damages as of 21 November 2007 (the one exception calculated Yukos’ value as of 1 January 2012), these models

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<sup>48</sup> The RTS Index closing value on 5 November 2014 was 160.14. “Daily History of the RTS Oil & Gas,” Moscow Exchange, <http://moex.com/en/index/stat/dailyhistory.aspx?code=RTSog>. The ratio between this value and the closing value on 21 November 2007 (267.8) is 0.597984. Multiplying this ratio by the Tribunal’s 21 November 2007 “but for” equity value for Yukos (USD 61,075,800,000) yields USD 36,522,324,914.

<sup>49</sup> Final Awards Table T2.

<sup>50</sup> Final Awards Tables T2, T8.

<sup>51</sup> The average RTS Index closing value for the period 5 May through 5 November 2014 is 183.2787597. “Daily History of the RTS Oil & Gas,” Moscow Exchange, <http://moex.com/en/index/stat/dailyhistory.aspx?code=RTSog>. The ratio between this value and the closing value on 21 November 2007 (267.8) is 0.684386705. Multiplying this ratio by the Tribunal’s 21 November 2007 “but for” equity value for Yukos (USD 61,075,800,000) yields USD 41,799,465,538. This is USD 825,878,077 less than the Tribunal’s 30 June 2014 “but for” equity value.

contemplated that Claimants would instead be awarded interest from that date to the date of the Final Awards, and not hypothetical dividends.

46. In calculating Yukos' "but for" dividends, the Tribunal took as its starting point the free cash flow to equity figures included in Mr Kaczmarek's 2012 DCF model, even though that model suffered from the same fundamental defects that led the Tribunal to reject his 2007 DCF model. The Tribunal then adjusted these cash flows, first, to take account of what the Tribunal referred to as my "corrections" to Mr Kaczmarek's figures, and then to reflect the Tribunal's own further adjustments.<sup>52</sup> Neither Mr Kaczmarek nor I was afforded an opportunity to comment on the Tribunal's methodology or adjustments.

#### **E. The Tribunal's Exercise Of Its Discretion**

47. Before discussing the flaws in the Tribunal's methodology, I would like to offer several observations as an economist on the Tribunal's exercise of its discretion in awarding Claimants more than USD 50 billion in damages.
48. In referring to the Tribunal's exercise of its discretion, I mean, in particular, the Tribunal's adoption of its own non-standard approach to damages, based on combining elements of Mr Kaczmarek's models in unexpected ways. This approach departed in very significant ways from anything that either Mr Kaczmarek or I submitted, could have anticipated or had an opportunity to comment on. I would like to stress this point, because this Report is not concerned with the Tribunal's errors *per se*, but only with those errors as to which I was never afforded an opportunity to express my views.
49. Arbitral tribunals often exercise a certain degree of discretion in awarding damages, and there is often no need for the parties or their experts, once they have expressed their views, to have a further opportunity to comment on the tribunal's proposed approach to damages. There are, however, specific circumstances where, I believe, a tribunal should afford the parties a further opportunity to be heard. In my view, the damages awarded in this case are an example of the significant errors that can result when a tribunal goes beyond exercising its discretion, and develops its own non-standard methodology that departs in significant ways from the parties' submissions without allowing the parties an opportunity to

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<sup>52</sup> Final Awards ¶¶ 1800-1811.

comment. I identify below some of the key circumstances present here that lead me to this conclusion.

50. Mr Kaczmarek valued Yukos based on the results he obtained from three different models – a DCF model, a comparable transactions model and a comparable companies model. While I differed greatly with him as to how his models operated and on the values they generated, each of his models is a *type* of model that is frequently used in valuing companies. By contrast, the approach developed by the Tribunal – first determining Yukos’ “but for” value on an arbitrary date, then adjusting that value to another date, and then adding Yukos’ “but for” dividends from a separate and incompatible model – is not standard. While this approach is justifiable under some circumstances – for example, if the initial valuation is known to be accurate, if it is impossible to value the company on a different date using a standard methodology, and if the company’s dividends can be accurately estimated – none of these circumstances was present here.
51. The Tribunal’s non-standard approach was constructed out of elements drawn from two of Mr Kaczmarek’s models, which the Tribunal then “mixed and matched” in novel ways that were inconsistent both with each other and with Mr Kaczmarek’s models. In this instance, the results defy common sense – and basic economic principles – as I explain below.
52. A tribunal should not exercise its discretion if, in doing so, it would need to rely on a model that depends for its inputs on the outputs of a rejected model – especially one that has been found to have been reverse engineered to achieve a desired result, as was the case here. The exercise of discretion in these circumstance will almost certainly lead to the awarding of unjustified damages, as proved to be the case here, where the Tribunal used Mr Kaczmarek’s comparable companies model to determine Yukos’ “but for” equity value, even though it depended on outputs generated by his uncorrected DCF model. As I noted above, the Tribunal rejected Mr Kaczmarek’s DCF model because it found this model’s outputs to have been “influenced by Mr Kaczmarek’s own pre-determined notions as to what would be an appropriate result.”
53. The exercise of discretion is less likely to be problematic where the valuation issues are well understood and the tribunal can call on well-accepted solutions, developed by economists who have dealt with similar valuation problems in the past. By contrast, the

exercise of discretion is likely to be problematic where the valuation issues are outside the normal realm of valuation practice and there is no readily available precedent. In this case, the Tribunal sought to determine “but for” damages in respect of a company that the Tribunal found had effectively ceased to exist as an economic matter some 10 years before its valuation date. The valuation issues confronting the Tribunal were thus complex, as they require the construction of models able, with an acceptable level of confidence, to reproduce the hypothetical annual performance of a defunct company over the course of ten and a half years.

54. A tribunal will need to exercise its discretion if it must choose among proffered damage valuations when no further information or insight is likely to be available from either the parties or their experts. In this case, the Tribunal held that Claimants’ damages should be calculated as of 30 June 2014, a valuation date that neither Mr Kaczmarek nor I had previously considered in our calculations, and for which our submissions did not provide either an appropriate methodology or the necessary data. In my view, the Tribunal should have afforded Mr Kaczmarek and me an opportunity to express our views on how to determine Claimants’ damages (based on the Tribunal’s valuation dates and other findings), and on the Tribunal’s own proposed methodology.
55. Finally, a tribunal should be especially cautious in exercising its discretion if the choices it makes have a very large effect on the amount of damages awarded. In this case, I estimate that the flaws in the Tribunals’ non-standard approach resulted in the unwarranted awarding of not less than USD 21.651 billion in damages, representing more than 40 percent of the total amount of damages awarded to Claimants.
56. Thus, while I appreciate that arbitral tribunals sometimes need to exercise a certain degree of discretion in awarding damages, I believe that the Tribunal here went beyond the proper exercise of discretion, and that its failure to afford the parties an opportunity to comment on its own novel approach to damages led to the erroneous awarding of billions of dollars of damages.

#### **F. The Tribunal’s Calculation of Yukos’ “But For” Dividends**

57. In this Section, I discuss the amount of the “but for” dividends that the Tribunal awarded to Claimants. Before reviewing the Tribunal’s approach and calculations, I briefly review the

relationship between a company's equity value and its dividends, as this relationship is essential to understanding the fundamental flaw in the Tribunal's own non-standard approach.

(a) *The Relationship Between a Company's Equity Value and Its Dividends*

58. The return on an investment in a company's shares consists of (a) the change in the company's equity value *plus* (b) the dividends paid by the company. In order to facilitate comparisons among companies of different sizes and having different share prices, both types of return are typically expressed as a percentage of a company's equity value. For example, if Company A's equity value is €100 on 1 January and €110 on 31 December, then the return on Company A's equity value for that year will be 10%  $([110-100]/100 = 0.10)$ . If Company A also pays a dividend of €5 in that year, its shareholders will have an additional return of 5%  $(5/100 = 0.05)$ . The rate of return on a company's shares resulting from the payment of a dividend (5% in my example) is known as the company's "dividend yield."<sup>53</sup> Company A would therefore have had an overall return of 15% that year – 10% from the increase in Company A's equity value and 5% from Company A's dividend payment.
59. When a company pays a dividend, its equity value is reduced by the amount of the dividend. The wealth of its shareholders, however, remains unchanged, because the reduction in the company's equity value is exactly offset by the amount of the dividend its shareholders receive. For example, if Company B's equity value of €100 includes €10 of cash on hand, and the company pays a dividend of €5, then Company B's equity value will be €95 after payment of the dividend, but its shareholders will have received that same €5 in cash.
60. Other things being equal, a company's equity value and its dividend yield are inversely related. Increasing a company's dividend therefore lowers the rate of growth of its equity value. This is so because the cash that would otherwise have been re-invested in the company will have instead been paid out to the company's shareholders, and will not be available to contribute to the company's future equity value. Returning to my prior

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<sup>53</sup> A company's dividend yield (DY) is equal to the amount of its dividend (D) expressed as a percentage of its equity value (EV), or  $DY = [D / EV] \times 100$ . A company's annual dividend is therefore equal to  $DY \times EV / 100$ .

example, if Company B had instead paid a €10 dividend, then its equity value immediately thereafter would have been €90, and the company would have €5 less in cash to invest. Other things being equal, Company B's equity value will, as a result, be lower and will grow more slowly than it would have if the company had instead paid only a €5 dividend.

61. It follows from this inverse relationship that, other things being equal, a company's equity value can grow at a rate comparable to that of its peer companies only if it also pays dividends at a rate comparable to that of its peers. In particular, if a company pays dividends at a rate higher than that of its comparable peers, its equity value will in the future necessarily grow more slowly than the equity value of its peer group, and if it pays dividends at a lower rate, its equity value will grow more quickly.
62. The methodology developed by the Tribunal did not make allowance for the inverse relationship between a company's dividend yield and the rate of growth of its equity value. As I explain below, Mr Kaczmarek took account of this inverse relationship in his DCF models, but the Tribunal did not do so when it used the cash flow figures included in Mr Kaczmarek's 2012 DCF model to *independently* calculate Yukos' "but for" dividends.

(b) *The Relationship Between Yukos' Equity Value and Its Dividends*

63. The inverse relationship between the growth in a company's equity value and its dividend yield is subject to other things being equal. As discussed immediately below, the Tribunal twice addressed this issue in connection with its calculation of Yukos' "but for" equity value, and on both occasions found that Yukos was comparable in all relevant respects with the other companies that the Tribunal took into account in calculating Yukos' "but for" equity value. A necessary consequence of this finding is that the post-2004 "but for" investment returns (dividends plus change in equity value) on shares of Yukos should be roughly equal to the actual returns on shares of the companies the Tribunal identified as Yukos' peer firms.
64. The Tribunal first addressed this issue in using Mr Kaczmarek's comparable companies model to determine Yukos' 2007 "but for" equity value. As I explained above, this model is based on a "multiples" analysis – that is, it applied "multiples" derived from the financial performance of comparable companies to Yukos' own performance to arrive at a value for Yukos. A "multiples" analysis necessarily assumes that the companies from

which the “multiples” are derived are comparable in relevant respects with the company to be valued. The Tribunal concluded that this was the case here, stating that the companies included in Mr Kaczmarek’s comparable companies model (after the State-owned and non-Russian companies had been removed) had “characteristics similar to Yukos (notably in terms of production, reserves, profitability, revenue growth and financing structure).”<sup>54</sup> The Tribunal was thus of the view that other things were in fact equal as between Yukos and the companies included in Mr Kaczmarek’s comparable companies model. Indeed, if that had not been the case, the Tribunal could not have used this model to determine Yukos’ 2007 “but for” equity value.

65. This issue arose again in connection with the Tribunal’s use of the change in the RTS Index from 21 November 2007 (back to 19 December 2004 and forward to 30 June 2014) to adjust Yukos’ “but for” equity value. In explaining its decision to use the RTS Index for this purpose, the Tribunal approvingly noted that “[b]oth parties have referred to the RTS Oil and Gas index as a reliable indicator reflecting the changes in the value of Russian oil and gas companies.”<sup>55</sup> The Tribunal thus agreed that Yukos and the companies included in the RTS Index were comparable in all respects relevant to the change in their equity values during this period, as the Tribunal could not otherwise have used the RTS Index to adjust Yukos’ own post-2007 “but for” equity value.

66. Two important conclusions follow from this.

*First*, none of the Tribunal’s findings calls into question the inverse relationship between Yukos’ equity value and its dividend yield, or the inverse relationship between the equity values and dividend yields of the companies in the RTS Index.<sup>56</sup>

*Second*, Yukos’ post-2004 “but for” dividend yield should be comparable to the actual dividend yields of the companies in the RTS Index. If this were not the case, Yukos’

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<sup>54</sup> Final Awards ¶ 1715.

<sup>55</sup> Final Awards ¶ 1788.

<sup>56</sup> The diversion of a portion of Yukos earnings to its “complex” and “opaque” off-shore structure would also have resulted in Yukos’ equity value growing more slowly after 2007 than the weighted average equity value of the indexed companies, though for reasons having nothing to do with the inverse relationship between a company’s equity value and its dividends. I discuss in paragraphs 104 to 116 below the consequences of the Tribunal’s failure to take account of Yukos’ diversion of a portion of its earnings when calculating Yukos’ 2007 “but for” equity value.

equity value would not have grown at the same rate as that of its peer group (contrary to the Tribunal’s finding that it grew at precisely that rate), because Yukos’ payment of dividends at a higher (or lower) rate than that of the companies included in the RTS Index would have caused its equity value to grow more slowly (or more quickly) than that of its peers.

67. I would like to make it clear that the Tribunal’s conclusion that Yukos’ “but for” equity value would have tracked that of the companies included in the RTS Index over the ten and a half year period from 2004 to 30 June 2014 is not based on anything that either Mr Kaczmarek or I said, and that I have no reason to believe that this would have been the case. The point I wish to stress is that once the Tribunal reached this conclusion, it should have fixed the amount of Yukos’ “but for” dividends at a level that is consistent with the level of dividends that was actually paid over this period by the companies in the RTS Index.
68. In his First Report, Mr Kaczmarek explicitly agreed that Yukos’ free cash flow to equity – which both he and the Tribunal used as a proxy for the “but for” dividends that Yukos would have hypothetically paid – was inversely linked with the company’s “but for” equity value.<sup>57</sup> After acknowledging that some of Yukos’ free cash flow to equity would as a “practical matter” have been reinvested in the company, and *not* used to pay dividends, he explained that this would not have had any effect on Yukos’ overall value in his model, because any reduction in the amount of Yukos’ “but for” dividends resulting from the reinvestment of the company’s free cash flow to equity would be offset by a proportionate increase in Yukos’ “but for” equity value.

“As a practical matter, we recognize that not all of the free cash flows to equity generated by YukosSibneft would have been issued as dividends to shareholders.... However, since our valuation of YukosSibneft does not consider such reinvestments of cash flows, it is reasonable to assume these free cash flows would have been issued as dividends. Said differently, if a portion of these free cash flows had been invested in [the company] in lieu of dividends, then our equity value for YukosSibneft calculated in Section X would have been proportionally higher.”<sup>58</sup>

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<sup>57</sup> Mr Kaczmarek used the term “free cash flow to equity” to refer to “the cash flow that is available for payment to common shareholders.” First Kaczmarek Report ¶ 83. By this I understand Mr Kaczmarek to be referring to a company’s cash flow following payment of all its expenses, including interest payments.

<sup>58</sup> First Kaczmarek Report ¶ 392 n. 488.

69. Five important conclusions can be drawn from (a) the inverse relationship between Yukos’ “but for” dividends and “but for” equity value, (b) Mr Kaczmarek’s confirmation that his DCF models took account of this relationship, and (c) the Tribunal’s conclusion that Yukos and the companies included in the RTS Index were comparable in all relevant respects.

*First*, Mr Kaczmarek acknowledged that, as a “practical matter,” his DCF models overstated the amount of Yukos’ “but for” free cash flow to equity, and thus the amount of the company’s “but for” dividends.

*Second*, Mr Kaczmarek’s DCF models incorporated the inverse relationship between dividends and equity value, as the above quotation demonstrates, and were specifically designed to reduce the amount of Yukos’ “but for” equity value in proportion to their overstatement of the company’s “but for” dividends.

*Third*, the Tribunal, in determining Yukos’ “but for” dividends, used as its starting point the overstated free cash flow to equity figures included in Mr Kaczmarek’s 2012 DCF model.

*Fourth*, the Tribunal used *only* Mr Kaczmarek’s comparable companies model and the RTS Index (but not his DCF model) to determine Yukos’ “but for” equity value, and this methodology did *not* adjust the company’s “but for” equity value to reflect the inverse relationship between its “but for” dividends and its “but for” equity value.

*Fifth*, Yukos’ “but for” dividend yield should have been comparable to the actual dividend yield of the companies in the RTS Index.

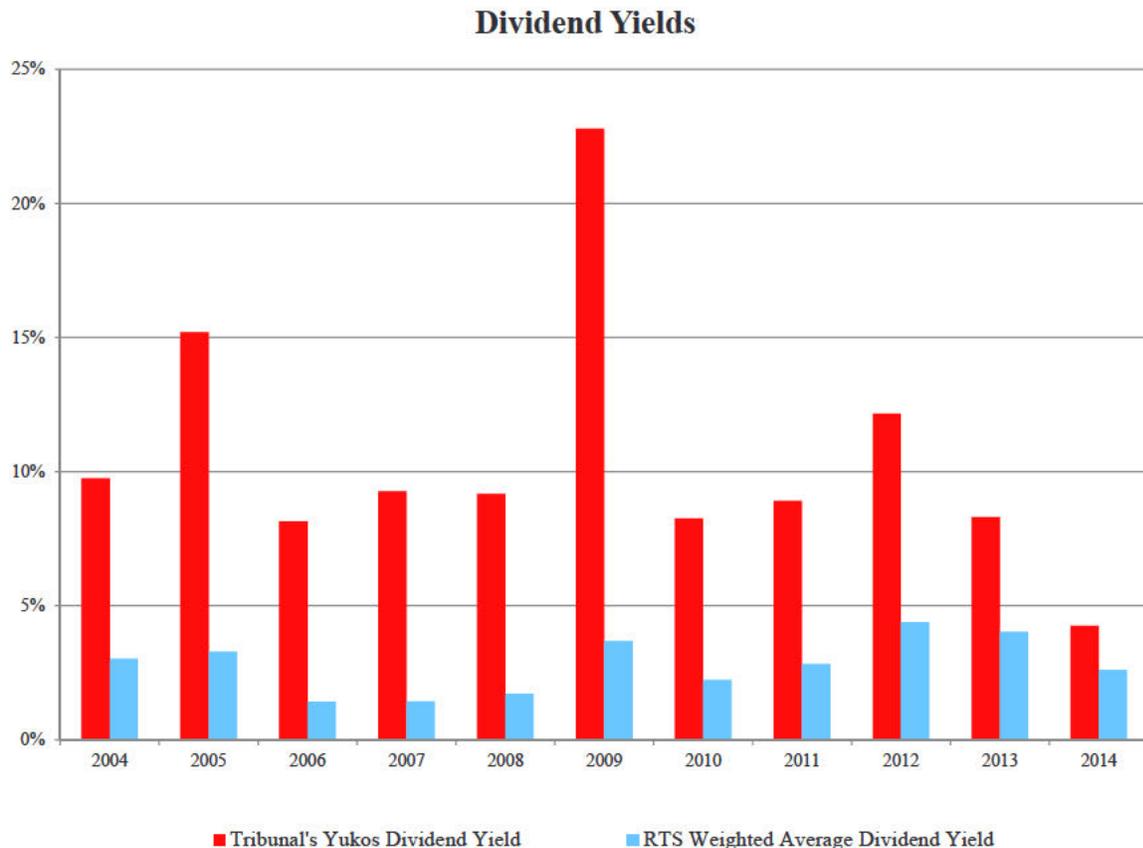
70. Of these conclusions, the fourth and fifth, in particular, are central to the fundamental flaw in the Tribunal’s own non-standard methodology.

(c) *The Magnitude of the Tribunal’s Over-Awarding of “But For” Dividends*

71. In this section I discuss the magnitude of the over-awarding of “but for” dividends resulting from the Tribunal’s use of its own non-standard methodology.

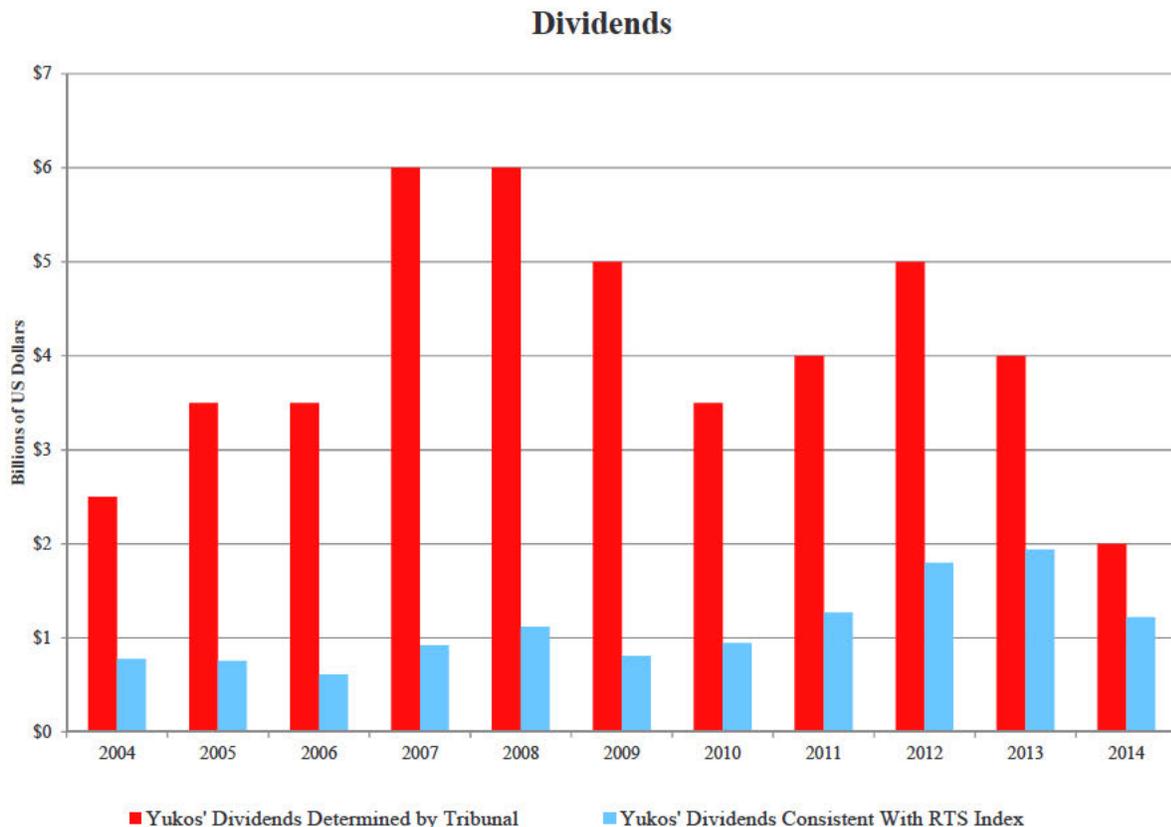
72. The Tribunal’s failure to take account of the inverse relationship between the growth in Yukos’ equity value and its dividend yield is illustrated in the graph below. This graph shows for each year from 2005 to 2014 (a) Yukos’ dividend yield (based on (i) the amount of the “but for” dividends that, according to the Tribunal, Yukos would have paid in each

of those years, and (ii) Yukos’ “but for” equity value for that year as found by the Tribunal), and (b) the historical weighted average dividend yield of all the companies included in the RTS Index (based on their actual dividends and equity values in those years).



73. The graph shows that the dividend yield implied by Yukos’ “but for” dividends and “but for” equity value as determined by the Tribunal (referred to as “Tribunal’s Yukos’ Dividend Yield”) greatly exceeds the weighted average historical dividend yield of the actual dividends paid by the companies included in the RTS Index. As I explained above, this is inconsistent with the Tribunal’s central finding that Yukos was comparable to the companies in the RTS Index and that its equity value grew at the same rate as that Index. Appendix A.1 to this Report sets out my calculation of the dividend yields shown in the graph above.
74. The Tribunal’s over-awarding of “but for” dividends can be illustrated by comparing the amount of the “but for” dividends that Yukos would have paid if its dividend yield had

been equal to the historical dividend yield of the companies in the RTS Index. The table below shows for each year from 2004 to 2014 (a) the US Dollar amount of Yukos’ annual dividend implied by the historical weighted average dividend yield of all the companies included in the RTS Index, and (b) the US Dollar amount of Yukos’ “but for” dividend as determined by the Tribunal. These figures are drawn from Appendix A.1 to this Report.



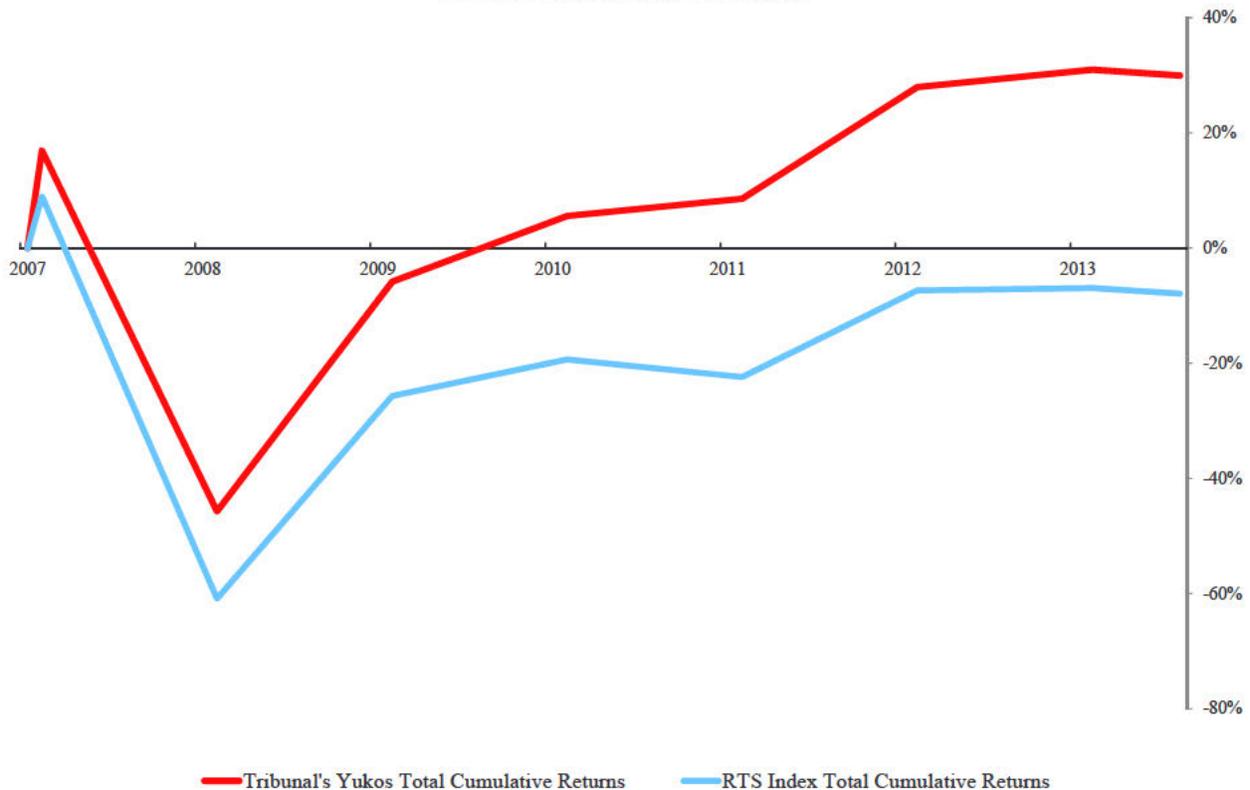
75. The Tribunal determined that Yukos would have paid a total of USD 45 billion of “but for” dividends for the years 2004 to 2014.<sup>59</sup> The total amount of Yukos’ “but for” dividends for this period that would have been consistent with the actual dividend yields of comparable Russian oil and gas companies in the RTS Index (shown in the graph above) is USD 12.17 billion. The USD 32.83 billion difference between these amounts (USD 45 billion – USD 12.17 billion) represents a reasonable approximation of the amount of Yukos’ “but for” dividends that was incorrectly determined by the Tribunal *solely* as a result of its failure to take account of the inverse relationship between the growth of Yukos’ “but for” equity

<sup>59</sup> Final Awards ¶ 1812.

value and its “but for” dividends. As this graph shows, the amount of Yukos’ “but for” dividends as determined by the Tribunal is more than three and a half times the amount of the dividends that would be consistent with the historical dividends paid by comparable Russian oil and gas companies.

76. The graph below illustrates the combined effect of the Tribunal’s failure to take account of the necessary connection between the Tribunal’s determination that Yukos’ “but for” equity value would have tracked that of the companies in the RTS Index, and the inverse relationship between the growth in a company’s equity value and its dividend yield. The graph shows for 2008 and for each year thereafter a significant discrepancy between (a) the total weighted average historical rate of return (percentage change in equity value, plus dividend yield) of the companies in the RTS Index, and (b) Yukos’ total “but for” rate of return based on the findings made by the Tribunal. If, as the Tribunal concluded, Yukos’ “but for” equity value grew at the same rate as that of the companies in the RTS Index, and Yukos was in all relevant respects comparable to the companies in the RTS Index, then Yukos’ total “but for” rate of return could not have significantly exceeded the historical rate of return of the companies in the RTS Index.
77. One necessary consequence of this inconsistency is that Yukos’ “but for” equity value and its “but for” dividends as found by the Tribunal cannot both be correct. Yukos could either have paid higher dividends and had a lower equity value in 2014, or paid lower dividends and had a higher equity value in 2014, but could not have paid both higher dividends *and* had a higher equity value in 2014.

### Total Cumulative Returns



78. If between 21 November 2007 and 30 June 2014 Claimants had held shares in a hypothetical company whose performance tracked the RTS Index, the graph shows that their investment would have *lost* roughly 8% of its value (notwithstanding the dividends Claimants would have received in the intervening years). The graph also shows that the damages awarded by the Tribunal assumes that Claimants would have instead realized a 30% *gain* on their “but for” shareholding over the same period. My calculation of these figures is presented in Appendices A.2 and A.3 to this Report. This significant disparity is inconsistent with the Tribunal’s assumption that Yukos and the companies in the RTS Index were comparable in all relevant respects. It results from the Tribunal having effectively double-counted Yukos’ cash flows – once in determining Yukos’ “but for” equity value and a second time in independently calculating Yukos’ “but for” dividends.
79. I have re-calculated the damages awarded to Claimants to take account of the amount of Yukos’ “but for” dividends that are attributable to the flaws in the Tribunal’s methodology, in particular, its combining in non-standard ways elements taken from Mr Kaczmarek’s

DCF model (used in calculating Yukos’ “but for” dividends) with elements taken from his comparable companies model and the RTS Index (used to independently determine Yukos’ “but for” equity value). I then accounted for (a) the interest awarded by the Tribunal on those economically unwarranted dividends, (b) Claimants’ ownership interest in Yukos, and (c) the Tribunal’s assessment of Yukos’ own contributory fault. My calculations show that the damages awarded to Claimants in respect of Yukos’ “but for” dividends and the interest on those dividends should have been not more than USD 7.26 billion, as opposed to the USD 27.48 billion actually awarded by the Tribunal. My calculations in support of these figures are set out in Appendix A.1.

(d) *The Fundamental Defects in Mr Kaczmarek’s 2007 and 2012 DCF Models*

80. I now address why it was inappropriate for the Tribunal to have used Mr Kaczmarek’s 2012 DCF model even as the “starting point” for its determination of Yukos’ “but for” dividends. This model represented an updated version of Mr Kaczmarek’s 2007 DCF model, with some (but not all) of his prior forecasts and projections replaced by post-2007 historical data (but not Yukos’ historical data).<sup>60</sup> As discussed above at paragraphs 32 to 33, the Tribunal concluded that “little weight should be given” to his 2007 DCF model, that it was not “sufficiently reliable to ground a determination of damages for this case,” and that “his DCF analysis had been influenced by his own pre-determined notions as to what would be an appropriate result.”<sup>61</sup> As also noted above, the Tribunal further determined that it was “unable to disassociate [the cash flows in his 2012 DCF model] from Claimants’ [2007] DCF model, which was convincingly criticized by Respondent’s expert and its counsel.”<sup>62</sup>
81. In the case of his 2007 DCF model – the only one presented by Claimants as the basis for calculating their damages – the Tribunal expressly rejected its use for that purpose, and the same defects in his 2012 DCF should have led to its being rejected as well. In light of the

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<sup>60</sup> Because Yukos did not exist as a going concern during the relevant period, certain of the cash-flow related figures that would have been unique to Yukos – such as its long term debt – were premised on Mr Kaczmarek’s assumptions even in his “historical” model. Second Kaczmarek Report Appendix AJ.4 note 12. All of the figures for 2012, 2013 and 2014, moreover, are Mr Kaczmarek’s projections, not historical figures.

<sup>61</sup> Final Awards ¶ 1785.

<sup>62</sup> Final Awards ¶ 1799.

fundamental problems with his DCF models that the Tribunal itself acknowledged, I do not believe the Tribunal was justified in using Mr Kaczmarek's 2012 DCF model as its "starting point" for determining Yukos' "but for" dividends.

82. I will limit myself to only one example of the economically implausible results generated by Mr Kaczmarek's 2012 DCF model. The Tribunal noted that this model used historical post-2007 data in place of *some* of the forecasts that were included in his 2007 DCF model.<sup>63</sup> In the case of Mr Kaczmarek's 2007 DCF model, the oil price was based on the forecast he made in 2007, which did not anticipate the Great Recession that began in 2008. By contrast, Mr Kaczmarek's 2012 DCF model is based on actual post-2007 oil prices. This difference can be seen, for example, in the two prices shown for a barrel of oil in 2009, with Mr Kaczmarek's 2007 DCF model projecting a price per barrel of roughly USD 84, and his 2012 model showing the historical price of USD 60 per barrel, reflecting that year's significant downturn in the global economy.<sup>64</sup>
83. Mr Kaczmarek's two DCF models also differed as to the amount of oil produced by Yukos in 2009, with his 2007 DCF model projecting total production of 102,084,601 tons and his 2012 DCF model using the 92,847,111 tons actually produced that year by Yukos' principal former production subsidiaries under Rosneft's ownership.<sup>65</sup>
84. The graphs below show the amounts of Yukos' free cash flow to equity for 2009 generated by Mr Kaczmarek's 2007 and 2012 DCF models, as well as the oil price and production data that were used in those models as discussed above. The price of a barrel of oil and the amount of oil produced by Yukos were by far the principal determinants of the company's free cash flow to equity. The free cash flow to equity figures included in Mr Kaczmarek's 2007 DCF model shows Yukos having USD 7.44 billion of free cash flow to equity in 2009. Implausibly, even though the historical price of a barrel of oil in 2009 and the historical amount of oil reportedly produced that year by Yukos' former production subsidiaries, which were used in his 2012 DCF model, are both *lower* than the comparable assumed figures for 2009 that were used in his 2007 DCF model, his 2012 DCF model

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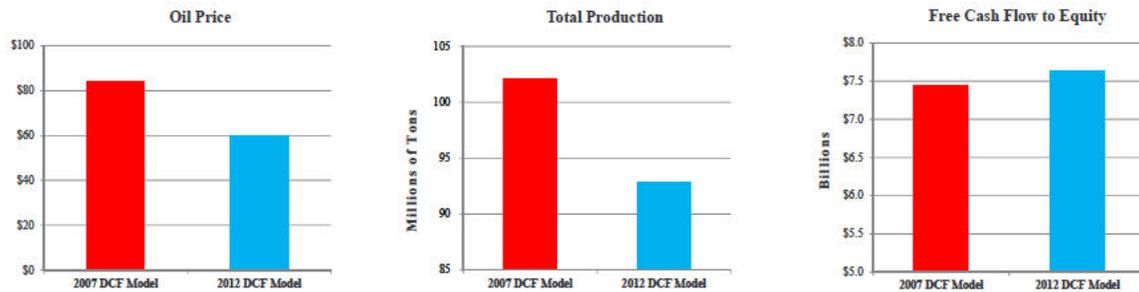
<sup>63</sup> Final Awards ¶ 1794.

<sup>64</sup> Second Kaczmarek Report Appendices J.13 and AJ.13.

<sup>65</sup> Second Kaczmarek Report Appendices J.10 and AJ.10.

generates *more* free cash flow to equity – approximately USD 200 million more – than does his 2007 DCF model for the same year. This is just one of many examples of the economically implausible “black box” results that I had in mind when I criticised Mr Kaczmarek’s DCF models as being “unchecked by common sense” and suggested that they may have been reverse-engineered to produce a predetermined outcome.

**Oil Prices, Total Oil Production and Free Cash Flow To Equity 2007 vs. 2012 DCF**



85. I cite this example because it illustrates the arbitrary nature of the reduction in his figures made by the Tribunal in determining the amount of Yukos’ “but for” dividends. In the case of 2009, the Tribunal reduced Mr Kaczmarek’s figure for 2009 by 34.6%, a reduction broadly consistent with the Tribunal’s average reduction for all years of 33.0%,<sup>66</sup> but provided no explanation as to why a roughly one-third reduction was appropriate in light of the implausibility of his figures. I return to this issue in paragraphs 92 to 95 below.

(e) *Yukos’ Post-2011 “But For” Dividends*

86. The Tribunal’s determination of Yukos’ “but for” dividends for 2012, 2013 and the first half of 2014 warrant further comment. The starting point for the Tribunal’s determination of these dividends (unlike the starting point for its calculation of Yukos’ “but for” dividends for prior years) was based solely on projections and forecasts. (For obvious reasons, Mr Kaczmarek’s 2012 DCF model did not include any historical information for subsequent years.) As the Tribunal observed, “no free cash flow to equity figures are provided by Claimants’ expert for the years 2012 to 2014 ..., [but] the Tribunal has been

<sup>66</sup> Final Awards ¶ 1811.

able to establish the relevant figures on the basis of Mr Kaczmarek’s methodology, using data provided elsewhere in Mr Kaczmarek’s reports.”<sup>67</sup>

87. The Tribunal then explained that to “calculate Yukos’ free cash flow to equity, Mr Kaczmarek uses the following formula: Free cash flow to equity = Free cash flow to the Firm – Tax-adjusted interest payments + Change in net debt + 20 percent of Sibneft dividends.”<sup>68</sup> In fact, for each of these inputs the Tribunal simply copied the projections and forecasts made in Mr Kaczmarek’s 2012 DCF model, as shown by the figures and extract from the Final Awards set out below.

Free Cash Flow To The Firm (USD)		
	2012 DCF Model <sup>69</sup>	Tribunal <sup>70</sup>
2012	8,650,212,831	8,650,212,831
2013	7,838,948,724	7,838,948,724
2014	7,330,053,779	7,330,053,779

Tax-Adjusted Interest Payments (USD Dollars)		
	2012 DCF Model <sup>71</sup>	Tribunal <sup>72</sup>
2012	-381,230,527	-381,230,527
2013	-375,218,163	-375,218,163
2014	-373,949,497	-373,949,497

Change in Net Debt (USD)		
	2012 DCF Model <sup>73</sup>	Tribunal <sup>74</sup>
2012	-19,498,383	-19,498,383
2013	18,542,647	18,542,647
2014	71,015,532	71,015,532

<sup>67</sup> Final Awards ¶ 1795.

<sup>68</sup> Final Awards ¶ 1796.

<sup>69</sup> Second Kaczmarek Report, Appendix AJ.2.

<sup>70</sup> Final Awards Table T4.

<sup>71</sup> Second Kaczmarek Report, Appendix AJ.2.

<sup>72</sup> Final Awards Table T5 at A-10.

<sup>73</sup> Second Kaczmarek Report, Appendix AJ.4; calculated as the annual change in Yukos’ total long- and short-term debt, less cash.

<sup>74</sup> Final Awards Table T6 at A-11.

Sibneft Dividends: “For the years 2012 through 2014, the Tribunal has assumed that the Sibneft dividends would have been equal to those paid in 2010.”<sup>75</sup>

88. The Tribunal’s determination of Yukos’ post-2011 dividends was thus based solely on the projected cash flows included in Mr Kaczmarek’s 2012 DCF model. As I indicated above, the Tribunal noted with respect to these cash flows that it was “unable to dissociate them from Claimants’ DCF model, which was convincingly criticized by Respondent’s expert and its counsel.”<sup>76</sup>
89. Set out below is a table showing the annual amount of Yukos’ “but for” dividends that, according to the Tribunal, Yukos would have paid (a) based on Mr Kaczmarek’s 2012 DCF model, (b) based on the illustrative “corrections” I made to his 2007 DCF model (if all of my “corrections” had been accepted by the Tribunal), and (c) as determined by the Tribunal. This is the same table as is found in paragraph 1811 of the Final Awards.<sup>77</sup>

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<sup>75</sup> Final Awards ¶ 1796.

<sup>76</sup> Final Awards ¶ 1799 and n. 2397.

<sup>77</sup> The Tribunal’s table implies that Mr Kaczmarek’s figures and my figures are comparable in an economically meaningful way. My figures reflect the illustrative corrections I made to Mr Kaczmarek’s 2007 DCF model, which valued Yukos as of 21 November 2007 and was based almost entirely on future projections and forecasts. By contrast, Mr Kaczmarek’s figures are drawn from his 2012 DCF model, which valued Yukos as of 1 January 2012 and was based partly on historical data and partly on future projections and forecast. I cannot think of any economically meaningful conclusion that could be arrived at by comparing the free cash flow to equity figures generated by Mr Kaczmarek’s largely *ex ante* 2007 DCF model (relative to 2014) with the comparable figures generated by his largely *ex post* 2012 DCF model. In my view, these two sets of figures have as much in common as chalk and cheese.

<b>Year</b>	<b>Kaczmarek</b>	<b>Dow</b>	<b>Tribunal</b>
2004	3.645	3.218	2.5
2005	4.796	4.489	3.5
2006	4.677	4.396	3.5
2007	8.484	7.670	6
2008	7.819	6.749	6
2009	7.642	5.463	5
2010	4.254	4.842	3.5
2011	6.285	4.283	4
2012	8.395	3.724	5
2013	7.628	3.148	4
2014 (first half)	3.586	1.310	2
<b>Total</b>	<b>67.213</b>	<b>49.293</b>	<b>45</b>

90. This table shows that for each year from 2004 to 2011 the amount of Yukos’ “but for” dividend as determined by the Tribunal is less than the amount of the “but for” dividend for that year that the Tribunal attributes to my “corrected” figures.<sup>78</sup> In contrast, the starting point for the Tribunal’s determination of Yukos’ “but for” dividends for 2012, 2013 and the first half of 2014 was solely Mr Kaczmarek’s projections and forecasts, and for each of those years the amount of Yukos’ “but for” dividend as determined by the Tribunal is greater than the amount of the “but for” dividend that the Tribunal attributes to my “corrected” figures.
91. To give a numerical sense of the effect of the different approach adopted by the Tribunal in determining Yukos’ post-2011 dividends, the total amount of Yukos’ “but for” dividends for the years 2004 to 2011 as determined by the Tribunal is 17.295% less than the total amount of the dividends for those years that the Tribunal attributes to my figures. If, in determining Yukos’ post-2011 dividends, the Tribunal had reduced the amount of the dividends for those years that the Tribunal attributes to my figures by 17.295%, the total

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<sup>78</sup> The figures included in the “Dow” column are based on corrections I made to demonstrate that Mr Kaczmarek’s DCF model was not useful for any purpose. The purpose of my “corrections” to certain errors in that model was to demonstrate its arbitrariness and unreliability. As I said in my second report, in my view his model is “so error filled, and dependent on assumptions and unknowable data,” that no corrections could make its outputs reliable or useful. Second Dow Report ¶¶ 316-317.

amount of Yukos’ “but for” dividends for 2012, 2013 and the first half of 2014 would have been USD 6.767 billion, or USD 4.233 billion *less* than the USD 11.0 billion that was in fact determined by the Tribunal for those years.

(f) *The Tribunal Did Not Provide Any Reason for the Size of the Adjustments It Made to Yukos’ “But For” Dividends*

92. The Tribunal adjusted the amount of Yukos’ “but for” dividends that it derived from Mr Kaczmarek’s figures and from my supposedly “corrected” figures to take account of the three factors listed below that, according to the Tribunal, neither Mr Kaczmarek nor I had addressed.

(a) the risk that Yukos’ cash flows might have been subject to significant additional taxes if Yukos had remained a private company;

(b) the risk, acknowledged by Yukos, that it might in the future need to reduce the amount of its dividends due to changes in Russian law or its interpretation; and

(c) the risks associated with what the Tribunal referred to as Yukos’ “complex” and “opaque structure” and, in particular, the risk that Yukos would have diverted a portion of its future earnings to offshore companies wholly owned by Yukos, so as not to share those earnings with the company’s own minority shareholders.<sup>79</sup>

93. The Tribunal did not, however, provide any reason for the *size* of the adjustments it made to Yukos’ “but for” dividends. These adjustments amounted to USD 22.213 billion in the case of Mr Kaczmarek’s figures and USD 4.293 billion in the case of my “corrected” figures.

94. I was surprised that the Tribunal made USD 22.213 billion of dividend adjustments without providing any analysis to support the size of its adjustments. This is a very large sum in any context, and I feel that the Tribunal should have consulted Mr Kaczmarek and me to obtain our views before making such a large adjustment.

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<sup>79</sup> Final Awards ¶¶ 1803-1808

95. As discussed above at paragraphs 45 to 46, the Tribunal’s adjustments included some of my correction to Mr Kaczmarek’s DCF model, as well as three further adjustments made by the Tribunal on its own initiative. Because the Tribunal did not indicate the size of any of its individual adjustments, I am not able to assess whether any individual adjustment, or the total adjustment, to Mr Kaczmarek’s figures made by the Tribunal has a proper economic basis.

**G. The Tribunal’s Calculation of Yukos’ “But For” Equity Value**

96. The damages awarded by the Tribunal included Claimants’ interest in Yukos’ “but for” equity value on 30 June 2014, less 25% of that amount, reflecting the Tribunal’s assessment of Claimants’ own contributory fault. In determining Yukos’ 2014 “but for” equity value, the Tribunal first estimated Yukos’ 2007 “but for” equity value using my *partially* corrected version of Mr Kaczmarek’s comparable companies model, and then adjusted that value to reflect the weighted average change in the value of the companies in the RTS Index between 21 November 2007 and 30 June 2014.
97. The Tribunal’s approach to determining Yukos’ “but for” 2007 equity value was non-standard in two respects.

*First*, as noted in paragraph 37 above, the Tribunal adopted *as* Yukos’ 2007 “but for” equity value a figure that I had presented to illustrate why his comparable companies model was unreliable and *should not* be used to determine that value.

*Second*, the Tribunal determined Yukos 2007 “but for” equity value figure using *only* my partially corrected version of Mr Kaczmarek’s comparable companies model, even though (a) that model’s equity value depended on Yukos’ earnings and EBITDA taken from Mr Kaczmarek’s DCF model, and (b) the Tribunal, in calculating Yukos’ “but for” dividends, adjusted his DCF figures in ways that reduced Yukos’ 2007 “but for” earnings and EBITDA. This reduction should have also reduced Yukos’ “but for” equity value, but did not do so in the Tribunal’s methodology, because the Tribunal determined Yukos’ “but for” equity value and dividends independently of each other.

(a) *The Tribunal's Use of the Figure That I Presented to Show Why Mr Kaczmarek's Comparable Companies Model Should Not be Used to Value Yukos*

98. After rejecting Mr Kaczmarek's DCF and comparable transaction models, the Tribunal decided to use his comparable companies model to value Yukos, explaining:

By contrast to all of the other methods canvassed above, the Tribunal does have a measure of confidence in the comparable companies method as a means of determining Yukos' value. While Professor Dow stated at the Hearing that he had not performed an analysis sufficient to fully endorse the figure resulting from his corrections to Claimants' comparable companies approach, he agreed that it 'could be a useful valuation.' The Tribunal for its part finds that the comparable companies method is, in the circumstances, the most tenable approach to determine Yukos' value as of 21 November 2007, and therefore the starting point for the Tribunal's further analysis.<sup>80</sup>

99. It will be helpful if I provide some further background to the Tribunal's decision. As briefly discussed at paragraphs 25 to 30 above, in my Second Report I illustrated the unreliability of Mr Kaczmarek's comparable companies model by showing that Yukos' 2007 "but for" equity value would be reduced by roughly one third if only two "comparability" changes were made to his model. This criticism related to the "multiples" used in Mr Kaczmarek's comparable companies model. I also noted that this reduction did *not* reflect the further reduction required by this model's use of the erroneous outputs of Mr Kaczmarek's DCF model. This criticism related to the cash flows and earnings figures to which Mr Kaczmarek's "multiples" were applied in his comparable companies model. In stating that "Mr Kaczmarek's models are so badly designed and so riddled with errors and inconsistent, weakly supported, or totally unsupported assumptions that it is not realistic for me to fully correct his model," and that the purpose of my "corrections" was "to illustrate the extent to which Mr Kaczmarek's analysis is unreliable and to indicate by order of magnitude the extent of his errors,"<sup>81</sup> I could not have been clearer that my partial "correction" of his comparable companies figure was still not "correct."<sup>82</sup>

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<sup>80</sup> Final Awards ¶ 1787.

<sup>81</sup> Dow Second Report ¶ 7 (emphasis supplied).

<sup>82</sup> Although I did not correct the cash flow and earnings figures to which Mr Kaczmarek's "multiples" were applied, these figures originated from his DCF model, which I did criticize and which the Tribunal rejected as unreliable. The Tribunal nevertheless relied on the figures included in his DCF model, making some adjustments which I discuss below.

100. The Tribunal nonetheless adopted my figure – offered to illustrate why Mr Kaczmarek’s comparable companies model should *not* be used to determine Yukos’ 2007 “but for” equity value – as “the best available estimate for what Yukos would have been worth on 21 November 2007 but for the expropriation.”<sup>83</sup>
101. I find the Tribunal’s decision very surprising, and I regard the Tribunal’s “best estimate” of Yukos’ 2007 “but for” equity value to be incorrect and its use of that estimate as a valuation for Yukos to be unjustified.
102. Although not essential to my conclusion concerning the Tribunal’s decision, I would like to briefly address the Tribunal’s account of what I said at the hearing in The Hague about the comparable companies figure adopted by the Tribunal. At paragraph 1787 of the Final Awards, the Tribunal stated: “While Professor Dow stated at the Hearing that he had not performed an analysis sufficient to fully endorse the figure from his corrections to Claimants’ comparable companies approach, he agreed that it ‘could be a useful valuation.’”<sup>84</sup>
103. To say that a valuation could be “useful” means to me only that it could be of assistance in determining a company’s value, not that it should be “used” on its own as the entire valuation. I also did not state at the hearing that I could not “fully” endorse this figure, but rather “I do not think it would be responsible of me to endorse them for a purpose that they weren’t reported in [my report] as being useful for.”<sup>85</sup>

*(b) The Tribunal’s Failure to Adjust Yukos’ “But For” Equity Value to Reflect the Adjustments It Made in Determining Yukos’ “But For” Dividends*

104. In determining Yukos’ “but for” dividends, the Tribunal adjusted on its own initiative both the free cash flow to equity figures included in Mr Kaczmarek’s 2012 DCF model, as well as what the Tribunal referred to as my “corrections” to his figures. The Tribunal’s own adjustments and my “corrections” both would have reduced Yukos’ 2007 “but for” earnings” and EBITDA. As I explained at paragraphs 19 to 20 above, a reduction in Yukos’ hypothetical 2007 earnings or EBITDA would also have reduced Yukos’ 2007 “but

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<sup>83</sup> Final Awards ¶ 1784.

<sup>84</sup> Final Awards ¶ 1787 (emphasis supplied).

<sup>85</sup> Dow Testimony, Hr’g Transcript Day 12, 48.

for” equity value under the comparable companies model used by the Tribunal. The Tribunal nonetheless decided, in estimating Yukos’ 2007 “but for” equity value, not to make the same adjustments to Yukos’ 2007 earnings and EBITDA.

105. In particular, the Tribunal made two different types of adjustments to the free cash flow to equity figures included in Mr Kaczmarek’s 2012 DCF model in fixing the amount of Yukos’ “but for” dividends.

*First*, the Tribunal accepted some of my “corrections” to Mr Kaczmarek’s DCF model, “notably those related to the interpretation of the historical information”<sup>86</sup> he used in his 2012 DCF model. The Tribunal also specifically noted that it accepted my “corrections” of Mr Kaczmarek’s underestimation of Yukos’ transportation costs and “certain operating expenses.”<sup>87</sup>

*Second*, the Tribunal found that neither Mr Kaczmarek nor I had adequately taken into account three additional risks that would have affected Yukos’ free cash flow to equity.<sup>88</sup> In particular, the Tribunal concluded that the free cash flow to equity figures included in Mr Kaczmarek’s 2012 DCF model, and then “corrected” by me to the extent accepted by the Tribunal, should be further adjusted to reflect the three additional risks referred to in paragraph 92 above.

106. The Tribunal’s correction of Yukos’ transportation costs and certain other operating expenses, and its downward adjustment of Yukos’ “but for” dividends based on the likely diversion of a portion of its earnings and its payment of higher taxes, would all have reduced Yukos’ 2007 “but for” earnings and EBITDA, and thus also have reduced Yukos’ 2007 “but for” equity value. The Tribunal nonetheless decided *not* to take these adjustments into account in determining Yukos’ 2007 “but for” equity value.
107. For the reasons explained below, it is not possible to quantify precisely the effect of this flaw in the Tribunal’s approach. I am able, however, to demonstrate on conservative assumptions that this decision resulted in the overstatement of Yukos’ 2007 “but for” equity value by not less than USD 3.854 billion.

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<sup>86</sup> Final Awards ¶ 1800.

<sup>87</sup> Final Awards ¶ 1801.

<sup>88</sup> Final Awards ¶ 1803.

108. The Tribunal did not provide a comprehensive list of my “corrections” that it accepted or a quantitative breakdown of the further adjustments it made on its own initiative. All that can be definitively said is that my two accepted “corrections” that were specifically identified by the Tribunal – Mr Kaczmarek’s underestimation of Yukos’ transportation expenses and “certain operating expenses” – would both have reduced the company’s 2007 “but for” earnings and EBITDA.
109. The Tribunal did include a table at paragraph 1811 of the Final Awards (reproduced at paragraph 89 above), listing the amount of the “but for” dividend that, according to the Tribunal, Yukos would have paid in each year based on (a) Mr Kaczmarek’s figures, (b) my “corrections” to his figures (assuming, contrary to fact, that the Tribunal had accepted *all* of my “corrections”), and (c) the Tribunal’s own further adjustments. For each year, the difference between Mr Kaczmarek’s figure and the Tribunal’s figure represents the total USD amount of the adjustments made by the Tribunal. This difference thus reflects both my “corrections” of Mr Kaczmarek’s figures (to the extent accepted by the Tribunal) and the Tribunal’s own further adjustments. For 2007, the difference between Mr Kaczmarek’s figure and the Tribunal’s figure is USD 2.484 (USD 8.484 – 6).
110. However, not all of the adjustments made by the Tribunal on its own initiative would have reduced the amount of the company’s 2007 “but for” earnings or EBITDA, and thus also have reduced the company’s 2007 “but for” equity value. Of the three adjustments made by the Tribunal on its own initiative:
- (a) the diversion of a portion of Yukos’ 2007 “but for” earnings would have reduced both the amount of Yukos’ 2007 “but for” earnings and EBITDA;
  - (b) an increase in Yukos’ 2007 “but for” taxes would have reduced its 2007 “but for” earnings but not its 2007 “but for” EBITDA (because the reduction in Yukos’ EBITDA resulting from the reduction in its earnings would have been precisely offset by the increase in its taxes); and
  - (c) a reduction in Yukos’ 2007 “but for” dividend resulting from a change in Russian law would not have reduced its 2007 “but for” earnings or EBITDA (because a company pays its dividends *from* its earnings).

111. In describing the three further adjustments that it made on its own initiative, the Tribunal indicated the economic significance it attached to each adjustment. In order of economic significance, the Tribunal (a) referred to the risk that Yukos would divert a portion of its earnings to its opaque off-shore structure as “perhaps” the “most significant...” risk, (b) described the risk that Yukos would be subject to increased taxes as “significant,” and (c) was silent on the significance of the risk that Yukos would have to reduce its dividends due to a change in Russian law.<sup>89</sup>
112. I take this to mean that the Tribunal assigned the greatest economic significance to the risk of a diversion of earnings, intermediate economic significance to the risk of additional taxes, and the smallest economic significance to the risk of a change in the company’s dividend policy. But because the Final Awards are not entirely clear on this point, I have conservatively assumed that each risk reduced Yukos’ 2007 “but for” free cash flow to equity by one-third of the USD 2.484 billion total adjustment made by the Tribunal to Mr Kaczmarek’s 2007 “but for” dividend – or by USD 828 million (USD 2.484 billion/3) in the case of each risk.
113. This is a conservative assumption not only because the Final Awards assigned greater economic significance to both the risk of diverted earnings (which would have reduced Yukos 2007 “but for” earnings and EBITDA) and the risk of additional taxes (which would have reduced Yukos’ “but for” earnings), but also because it assigns no weight at all to my “corrections” of Yukos’ transportation and operating expenses, which would have reduced both Yukos’ 2007 “but for” earnings and EBITDA.
114. On these assumptions, which I regard as conservative, the Tribunal should have:
- (a) reduced Yukos’ 2007 “but for” earnings by at least USD 1.656 billion (USD 828 million + USD 828 million) to reflect the risk that Yukos would have diverted a portion of its earnings and would have paid higher taxes as a private company; and
  - (b) reduced Yukos’ 2007 “but for” EBITDA by at least USD 828 million to reflect the risk that Yukos would have diverted a portion of its earnings to its off shore structure.

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<sup>89</sup> Final Awards ¶ 1803-1812.

115. If Yukos' 2007 "but for" equity value is calculated using the same comparable companies model and the same inputs as were used by the Tribunal, save that (a) Yukos' 2007 "but for" earnings are reduced by USD 1.656 billion, and (b) the company's 2007 "but for" EBITDA is reduced by USD 828 million, Yukos' 2007 "but for" equity value would have been USD 57.221 billion, or USD 3.854 billion less than the USD 61.076 billion found by the Tribunal.<sup>90</sup> My calculations in support of these figures are set out in Appendix B.1.
116. If Yukos' 2007 "but for" equity value is further adjusted to reflect (a) the change in the RTS Index between 21 November 2007 and 30 June 2014, (b) Claimant's ownership interest in Yukos, and (c) the Tribunal's assessment of Claimants' own contributory fault, the damages awarded to Claimants in respect of Yukos' equity value should have been not more than USD 21.115 billion, or at least USD 1.422 billion less than the amount actually awarded to Claimants. It should be stressed that this figure represents a conservative lower bound on the economically unwarranted damages awarded to Claimants in respect of their interest in Yukos' "but for" equity value, both for the reason explained directly above and because my calculation does not take account of the Tribunal's conclusion that Yukos would likely have diverted a portion of its earnings to its "complex" and "opaque" off shore structure. This would have further reduced Yukos' earnings and EDITDA, and hence further reduced its "but for" equity value. My calculations in support of these figures are set out in Appendix B.2, and are based on the same methodology and inputs that were used by the Tribunal, save for the reductions in the company's 2007 "but for" earnings and EBITDA that the Tribunal itself accepted in determining the amount of Yukos' 2007 "but for" dividend.

Signed: 8 November 2014



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James Dow

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<sup>90</sup> In re-calculating Yukos' 2007 "but for" equity value, I have also used the same 90/10 equity/debt capital structure assumed by the Tribunal. Final Awards ¶ 1783.

## Annex 1

## James Dow

Year of Birth: 1961  
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### Present Position

Professor of Finance, London Business School, 1999-  
David Pyott Term Chair, 2008-.

### Formerly

Chair of Finance Subject Area, and Director, Institute of Finance and Accounting, London Business School, 2005-2008.  
Managing Editor, *Review of Economic Studies*, 1999-2003.  
Research Dean, London Business School, 1999-2001.  
Professor of Economics, European University Institute, 1995-1998.  
Head of Economics Department, European University Institute, 1996-97.  
Associate Professor of Finance, London Business School, 1994-5.  
Assistant Professor of Finance, London Business School 1989-94.  
Assistant Professor of Economics, University of Pennsylvania, 1986-88.

### Education

Princeton University PhD 1987, Three Essays on Search and Information.  
Thesis committee: Hugo Sonnenschein (Chair), Albert S Kyle, Barry Nalebuff, Joseph E Stiglitz.  
Alfred P Sloan Doctoral Dissertation Fellow 1985-86.

Cambridge University BA (Double First Class in Economics) 1982, MA 1986.  
Prize scholar, Churchill College, Cambridge University, 1980-83.

### Publications

1. "Contractual incompleteness, limited liability and bubbles," with Jungsuk Han, *Journal of Financial Economics*, forthcoming.
2. "Boards, CEO entrenchment, and the cost of capital," *Journal of Financial Economics*, Volume 110, 680-695, 2013.
3. "Noise Trade," with Gary Gorton, entry in *The New Palgrave Dictionary of Economics*, edited by Steven N. Durlauf and Lawrence E. Blume, Palgrave Macmillan, 2008.
4. "CEO Compensation, Change, and Corporate Strategy," with Clara Raposo, *Journal of Finance*, Vol. 560, no. 6, pp 2701-2727, December 2005.
5. "Equilibrium Investment and Asset Prices under Imperfect Corporate Control," previously entitled "Corporate Finance and Asset Pricing," with Gary Gorton and Arvind Krishnamurthy (Best paper award in corporate finance at the WFA 2003) *American Economic Review* vol.93, no.3, pp 659-681, June 2005.
6. "Is Liquidity self-fulfilling?," previously entitled "Self-sustaining Liquidity in an Asset Market with Asymmetric Information," *Journal of Business*, vol. 77, number 4, pp 895-908, October 2004.

7. "Informed Trading, Investment, and Economic Welfare", with Rohit Rahi, *Journal of Business*, vol. 76, no. 3, pp 430-454, 2003.
8. "What is Systemic Risk? Moral hazard, initial shocks and propagation," *Monetary and Economic Studies*, Vol.18, No.2, December 2000, 1-24.
9. "Should Speculators be Taxed?", with Rohit Rahi, *Journal of Business*, January 2000, vol. 73, no. 1, pp 89-107.
10. "Arbitrage, Hedging, and Financial Innovation", *Review of Financial Studies* vol 11 no 4, 1998, pp 739-755.
11. Comments on "Banks, Markets and the Allocation of Risk in an Economy" by Martin Hellwig, *Journal of Institutional and Theoretical Economics (Zeitschrift für die gesamte Staatswissenschaft)*, Vol. 154, No.1, March 1998, 346-351.
12. "Noise Trading, Delegated Portfolio Management, and Economic Welfare", with Gary Gorton, *Journal of Political Economy*, Vol. 105, No. 5, October 1997, pp 1024-1050.
13. "Stock Market Efficiency and Economic Efficiency: Is There a Connection?", with Gary Gorton, *Journal of Finance*, Vol.52, No.3, July 1997, pp 1087-1129.
14. "Profitable Informed Trading in a Simple General Equilibrium Model of Asset Pricing", with Gary Gorton, *Journal of Economic Theory*, Vol. 67, No.2, November 1995.
15. "Lending Resumption in a Reputational Model of Sovereign Debt", with Harold L Cole and William B English, *International Economic Review*, Vol.36, No.2, May 1995, pp 365-385.
16. "Nash Equilibrium under Knightian Uncertainty: Breaking Down Backward Induction", with Sérgio Ribeiro da Costa Werlang, *Journal of Economic Theory*, Vol. 64, No.2, December 1994, pp 304-324.
17. "Arbitrage Chains," with Gary Gorton, *Journal of Finance*, Vol.49, No. 3, July 1994, pp 819-849. Reprinted in Bruno Biais and Marco Pagano (Eds.), *New Research in Financial Markets*, Oxford University Press and CEPR, 2001.
18. "The Return on the Market and the Social Discount Rate: A Note on Welfare in an Overlapping Generations Model", with Gary Gorton, March 1993, *Economics Letters*, Vol. 43, No.1, November 1993, pp 23-26.
19. "Trading, Communication and the Response of Asset Prices to News", with Gary Gorton, *Economic Journal*, Vol.103, No.418, May 1993, pp 639-646.
20. "Uncertainty Aversion, Risk Aversion and the Optimal Choice of Portfolio", with Sérgio Ribeiro da Costa Werlang, *Econometrica*, Vol. 60, No.1, January 1992, pp 197-204. Reprinted in Itzhak Gilboa (Ed.) *Uncertainty in Economic Theory: Essays in Honor of David Schmeidler's 65th Birthday*, Routledge Frontiers of Political Economy, 63, 2004.
21. "Excess Volatility of Stock Prices and Knightian Uncertainty", with Sérgio Ribeiro da Costa Werlang, *European Economic Review*, Vol.36, 1992, pp 631-638.
22. "The Ex-ante Non-optimality of the Dempster-Shafer Updating Rule for Ambiguous Beliefs", with Sérgio Ribeiro da Costa Werlang, in Yoram Moses (ed) *Proceedings of the Fourth Conference on Theoretical Aspects of Reasoning about Knowledge*, San Mateo, CA: Morgan Kaufman Publishers, 1992, pp 163-166.
23. "Homothetic Preferences", with Sérgio Ribeiro da Costa Werlang, *Journal of Mathematical Economics*, Vol. 21, 1992, pp 389-394.

24. "Search Decisions with Limited Memory", *Review of Economic Studies*, Vol 58, No 1, January 1991, pp 1-14.
25. "The Consistency of Welfare Judgements with a Representative Consumer", with Sérgio Ribeiro da Costa Werlang, *Journal of Economic Theory*, Vol.44, No.2, April 1988, pp 269-280.
26. "Samuelson and Chipman-Moore on Utility-Generated Community Demand", with Hugo Sonnenschein, in Maurice H Peston and Richard E Quandt (eds): *Prices, Competition and Equilibrium: Essays in Honour of William J Baumol*, Oxford: Philip Allan, 1986.

### **Current Research Papers**

1. "Optimal contract duration for CEOs," with Clara Raposo.
2. "Resistance to Change," with Enrico Perotti
3. "Incentives to produce information in financial markets," with Itay Goldstein and Alexander Guembel.
4. "Should we commit to bailing out the financial system?" with Jungsuk Han

### **Unpublished Working Papers**

1. "Financing Securities Trading", with Nathalie Rossiensky, November 1999.
2. "Laws of Large Numbers for Non-additive Probabilities", with Sérgio Ribeiro da Costa Werlang, 1994.
3. "Knightian-Rational Expectations, Inflationary Inertia and Money Neutrality", with Mario Henrique Simonsen and Sérgio Ribeiro da Costa Werlang, 1993.
4. "No Trade Theorems and Non-Bayesian Behavior", with Vicente Madrigal and Sérgio Ribeiro da Costa Werlang, London Business School, 1990.
5. "Almost Competitive Price Dispersion", CARESS - University of Pennsylvania, 1987.
6. "A Note on Almost Competitive Price Dispersion", 1987.
7. "Arbitrator and Negotiator Behavior under an Appellate System", with Orley A Ashenfelter and Daniel G Gallagher, 1986.

### **Teaching Experience**

#### At London Business School

- Corporate Finance, Sloan Fellows Programme, 2002-2013
- Corporate Finance and Valuation, Master in Finance Programme, 2010-2014
- Corporate Finance, full-time MBA and Executive MBA, 1990-1994, 1999-2002, 2004-5
- Advanced Corporate Finance, 1994-1996
- PhD course in Financial Economics, 1990-1994, 1999-2001
- Financial Seminar for Senior Managers (Executive Education, short course) 1992-1994
- Supervised six PhD students, including Norvald Insteffjord (placed at Birkbeck College), Nathalie Rossiensky (placed at Duke University), Clara Raposo (placed at Said School, Oxford), Jungsuk Han (placed at Stockholm School of Economics).
- Prize for best teacher in programme, Executive MBA class of January 2003
- Runner up for prize for best teacher in programme, Sloan Fellows programme, 2007.
- Prize for best teacher in programme, Sloan Fellows programme 2008

#### At the European University Institute

- PhD course in Corporate Finance, 1998
- PhD course in Financial Markets, 1996-1997
- PhD course in Game Theory, 1995-1996
- Supervised six PhD students, including Alexander Guembel (placed at Said School, Oxford), Issam Hallak (placed at Bocconi).

#### At the University of Pennsylvania

- Undergraduate Microeconomics, 1986-1987
- PhD Microeconomic Theory, 1986-1988

**Miscellaneous**

Erdős number: 4

## Appendices

## Appendix A.1 - Comparison Of Dividend Yields

Year	Yukos Dividends Fixed by the Tribunal	RTS Oil & Gas Index	Tribunal's Implied Equity Value of Yukos	Tribunal's Yukos Dividend Yield	RTS		Interest on RTS-Consistent Dividends to 30 June 2014
					Weighted Average Dividend Yield	Yukos Dividends Consistent with RTS Oil & Gas Index	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
2004	\$ 2,500,000,000	112.47	\$ 25,650,467,610	9.75%	3.02%	\$ 773,861,483	\$ 249,152,443
2005	\$ 3,500,000,000	101.04	\$ 23,043,684,959	15.19%	3.29%	\$ 757,166,937	\$ 218,117,080
2006	\$ 3,500,000,000	188.48	\$ 42,985,686,273	8.14%	1.42%	\$ 610,854,230	\$ 155,266,928
2007	\$ 6,000,000,000	283.97	\$ 64,763,610,627	9.26%	1.42%	\$ 922,870,956	\$ 203,299,243
2008	\$ 6,000,000,000	286.94	\$ 65,440,963,600	9.17%	1.71%	\$ 1,117,188,900	\$ 208,244,011
2009	\$ 5,000,000,000	96.18	\$ 21,935,289,186	22.79%	3.68%	\$ 806,587,135	\$ 123,012,604
2010	\$ 3,500,000,000	186.02	\$ 42,424,646,438	8.25%	2.23%	\$ 945,165,542	\$ 112,115,537
2011	\$ 4,000,000,000	196.97	\$ 44,921,957,901	8.90%	2.82%	\$ 1,267,790,560	\$ 107,419,894
2012	\$ 5,000,000,000	180.29	\$ 41,117,834,137	12.16%	4.38%	\$ 1,801,706,125	\$ 61,059,821
2013	\$ 4,000,000,000	211.18	\$ 48,162,761,180	8.31%	4.03%	\$ 1,939,553,935	\$ 98,606,922
2014	\$ 2,000,000,000	206.41	\$ 47,074,891,255	4.25%	2.60%	\$ 1,222,626,614	\$ 20,723,521
Total	[A] \$ 45,000,000,000					\$ 12,165,372,415	\$ 1,557,018,003
Average of Annual Yields	[B]			10.56%	2.78%		
Claimants' Share of Total	[C] \$ 31,723,467,658					\$ 8,576,173,297	\$ 1,097,644,672
Contribution of Total to Damages Award	[D] \$ 23,792,600,744					\$ 6,432,129,973	\$ 823,233,504
Total Interest on Dividends Awarded by the Tribunal	[E] \$ 3,691,205,228						
Total Dividends and Interest Awarded by the Tribunal	[F] \$ 27,483,805,972						
Total Dividends and Interest Consistent with RTS Oil & Gas Index	[G] \$ 7,255,363,477						
Excess Dividends and Interest Awarded by the Tribunal	[H] \$ 20,228,442,495						

### Sources and Notes:

[1]: Yukos Dividends drawn from Final Awards ¶ 1811.

[2]: RTS Oil & Gas Index figures reflect the index close value on the last trading day of the preceding year, as reflected at <http://moex.com/en/index/stat/dailyhistory.aspx?code=RTSog>.

[3]: Tribunal's Implied Equity Value of Yukos figures equals the closing value of the RTS Oil & Gas Index reflected in column [2] divided by the closing value of the RTS Oil & Gas Index on 21 November 2007 (i.e., 267.8), multiplied by the equity value of Yukos on 21 November 2007 as fixed by the Tribunal (i.e., USD 61.076 billion). See Final Awards ¶¶ 1815, 1821.

[4]: Tribunal's Yukos Dividend Yield = [1] / [3].

[5]: Calculated by multiplying the dividend yield of each of the companies comprising the index in that year by the weighting that company's equity value is given in the calculation of the RTS Oil & Gas Index, and taking the sum of those figures. For the period 2005 through 2010, these weightings are available at <http://moex.com/a912>. For the period thereafter, they are drawn from <http://moex.com/en/index/RTSog/constituents/>. The dividend yield of each firm in a given year is based on the dividends per share declared by the firm in that year divided by the firm's share price at the beginning of the following year, based on dividends reported on Bloomberg and share prices from the Moscow Exchange and, where necessary, other sources. For the year 2004, for which the data necessary to complete this analysis was not available, the figure in column [5] reflects the simple average of the values in column [5] for the remaining years.

[6]: Yukos Dividends Consistent With RTS Oil & Gas Index = [5] x [3].

[7]: Interest on RTS-Consistent Dividends to 30 June 2014 is the result of applying the Tribunal's interest factors (as reported in Final Awards Table T7, Annexes, page A-12) to the Yukos Dividends Consistent With RTS Oil & Gas Index (i.e., column [6]).

[A]: Total reflects the sum of the values in column [1], [6], or [7], respectively.

[B]: Average Annual Yields reflects the simple average of the values in column [4] or column [5], respectively.

[C]: Claimants' Share of Total equals the Total Dividends or Interest in row [A] multiplied by the Claimants' total interest in Yukos (70.4965947960625%). See Final Awards ¶ 1816.

[D]: Contribution of Total to Damages Award is the Claimants' pro rata share of Total Interest or Dividends in row [C] reduced by 25% to account for Claimants' contributory fault as determined by the Tribunal. See Final Awards ¶ 1827.

[E]: Total Interest on Dividends Awarded by the Tribunal equals the Tribunal's total interest on Yukos Dividends (drawn from Final Awards Table T3), multiplied by the Claimants' total interest in Yukos (70.4965947960625%), reduced by 25% to account for Claimants' contributory fault as determined by the Tribunal.

[F]: Total Dividends and Interest Awarded by the Tribunal = column [1] of row [D] + [E].

[G]: Total Dividends and Interest Consistent with RTS Oil & Gas Index equals column [6] of row [D] plus column [7] of row [D].

[H]: Excess Dividends and Interest Awarded by the Tribunal equals [F] - [G].

**Appendix A.2 - Total Cumulative Returns Since 21 November 2007  
As Implied By The Tribunal's Award**

Index Date	RTS Oil & Gas Index Value on Index Date	Tribunal's Yukos Dividend Yield	Implied Dividend Value per Index Unit	Implied Interest Amount per Index Unit	Total Cumulative Value per Index Unit	Total Cumulative Return
	[1]	[2]	[3]	[4]	[5]	[6]
11/21/2007	267.80				\$267.80	
12/31/2007	286.94	9.17%	\$26.31	\$0.00	\$313.25	17.0%
12/31/2008	96.18	22.79%	\$21.92	\$0.89	\$145.30	-45.7%
12/31/2009	186.02	8.25%	\$15.35	\$1.63	\$252.12	-5.9%
12/31/2010	196.97	8.90%	\$17.54	\$2.15	\$282.77	5.6%
12/31/2011	180.29	12.16%	\$21.92	\$2.75	\$290.76	8.6%
12/31/2012	211.18	8.31%	\$17.54	\$3.49	\$342.68	28.0%
12/31/2013	206.41	4.25%	\$8.77	\$4.09	\$350.77	31.0%
6/30/2014	203.75				\$348.11	30.0%

**Sources and Notes:**

[1]: RTS Oil & Gas Index figures reflect the index close value as of the Index Date, as reflected at <http://moex.com/en/index/stat/dailyhistory.aspx?code=RTSog>.

[2]: See Appendix A.1, column [4].

[3]: Implied Dividend Value per Index Unit = [2] x [1].

[4]: The Implied Interest Amount per Index Unit in each year is equivalent to the rate of pre-award interest fixed by the Tribunal (i.e., 3.389%) multiplied by the sum of the Implied Dividend Value per Index Unit (i.e., column [3]) for the prior years.

[5]: Total Cumulative Value per Index Unit in each year reflects the RTS Oil & Gas Index Value set forth in column [1] plus (a) the sum of the Implied Dividend Value per Index Unit (i.e., column [3]) for all preceding years and (b) the sum of the Implied Interest Amount per Index Unit (i.e., column [4]) for all preceding years.

[6]: Total Cumulative Return = [5] / \$267.80, expressed as a percentage. \$267.80 is the value of the RTS Oil & Gas Index on 21 November 2007.

### Appendix A.3 - Actual Total Cumulative Returns Since 21 November 2007 Of the RTS Oil & Gas Index

Index Date	RTS Oil & Gas Index Value on Index Date	RTS Weighted Average Dividend Yield	Implied Dividend Value per Index Unit	Implied Interest Amount per Index Unit	Total Cumulative Value per Index Unit	Total Cumulative Return
	[1]	[2]	[3]	[4]	[5]	[6]
11/21/2007	267.80				\$267.80	
12/31/2007	286.94	1.71%	\$4.90	\$0.00	\$291.84	9.0%
12/31/2008	96.18	3.68%	\$3.54	\$0.17	\$104.78	-60.9%
12/31/2009	186.02	2.23%	\$4.14	\$0.29	\$199.05	-25.7%
12/31/2010	196.97	2.82%	\$5.56	\$0.43	\$215.99	-19.3%
12/31/2011	180.29	4.38%	\$7.90	\$0.61	\$207.82	-22.4%
12/31/2012	211.18	4.03%	\$8.50	\$0.88	\$248.10	-7.4%
12/31/2013	206.41	2.60%	\$5.36	\$0.59	\$249.27	-6.9%
6/30/2014	203.75				\$246.61	-7.9%

#### **Sources and Notes:**

[1]: RTS Oil & Gas Index figures reflect the index close value as of the Index Date, as reflected at <http://moex.com/en/index/stat/dailyhistory.aspx?code=RTSog>.

[2]: See Appendix A.1, column [5].

[3]: Implied Dividend Value per Index Unit = [2] x [1].

[4]: The Implied Interest Amount per Index Unit in each year is equivalent to the rate of pre-award interest fixed by the Tribunal (i.e., 3.389%) multiplied by the sum of the Implied Dividend Value per Index Unit (i.e., column [3]) for the prior years.

[5]: Total Cumulative Value per Index Unit in each year reflects the RTS Oil & Gas Index Value set forth in column [1] plus (a) the sum of the Implied Dividend Value per Index Unit (i.e., column [3]) for all preceding years and (b) the sum of the Implied Interest Amount per Index Unit (i.e., column [4]) for all preceding years.

[6]: Total Cumulative Return = [5] / \$267.80, expressed as a percentage. \$267.80 is the value of the RTS Oil & Gas Index on 21 November 2007.

## Appendix B.1 - Yukos 2007 Comparable Companies Valuation

Multiple	Weighted Average Multiple Value	Yukos 2007 Reserves, Production, EBITDA, Earnings (millions)	Yukos Implied EV (millions)
<b><u>Comparable Companies Valuation Adopted By Tribunal</u></b>			
EV/Proven Reserves	[1a]	4.2	\$13,749
EV/Production	[1b]	84.1	\$630
EV/EBITDA	[1c]	5.3	\$13,041
P/E	[1d]	7.7	\$7,846
	[1e]	Value of 20% of Sibneft:	\$6,112
	[2a]	Average Implied Yukos 2007 Enterprise Value:	\$67,862
	[3a]	Equity Value as a Percentage of Enterprise Value:	90%
	[4a]	Implied Yukos 2007 Equity Value:	\$61,076
<b><u>Adjustments Reflecting The Dividends Fixed By The Tribunal</u></b>			
EBITDA	[5a]	-\$828	
Earnings	[5b]	-\$1,656	
<b><u>Comparable Companies Valuation Reflecting Conservative Assumptions Regarding The Tribunal's Dividends Adjustments, As Described In My Report</u></b>			
EV/Proven Reserves	[6a]	4.2	\$13,749
EV/Production	[6b]	84.1	\$630
EV/EBITDA	[6c]	5.3	\$12,213
P/E	[6d]	7.7	\$6,190
	[1f]	Value of 20% of Sibneft:	\$6,112
	[2b]	Average Implied Yukos 2007 Enterprise Value:	\$63,580
	[3b]	Equity Value as a Percentage of Enterprise Value:	90%
	[4b]	Implied Yukos 2007 Equity Value:	\$57,222
Conservative Estimate of Tribunal's overstatement of Yukos' equity value on 21 November 2007	[7]		\$3,854

### **Sources and Notes:**

[1a] through [1f]: *See* Second Dow Report, Appendices 16.1 and 16.2.

[2a]: Implied Yukos 2007 Enterprise Value is equal to the average of [1a] through [1d], plus [1e].

[2b]: Implied Yukos 2007 Enterprise Value is equal to the average of [6a] through [6d], plus [1f].

[3a] and [3b]: *See* Final Awards ¶ 1783.

[4a]: = [2a] x [3a]. Represents Yukos 2007 Equity Value as determined by the Tribunal. *See* Final Awards ¶ 1783.

[4b]: = [2b] x [3b]. Based on the Tribunal's method with modified inputs.

[5a] and [5b]: Changes that the Tribunal should have made to its EBITDA and Earnings figures based on its conclusions regarding Yukos' free cash flow to equity. These changes are explained in detail in the text of my report. *See* ¶¶ 109-115.

[6a] and [6b]: Identical to [1a] and [1b].

[6c] and [6d]: Recalculated multiples values of [1c] and [1d] reflecting the changes described in rows [5a] and [5b].

[7]: = [4a] - [4b].

For purposes of this analysis, Yukos' net debt is assumed to be USD 6,658 million, consistent with Mr Kaczmarek's assumption. *See* the Second Kaczmarek Report ¶ 69.

## Appendix B.2 - Impact of Adjustments To Comparable Companies Valuation on Damages Award

		As Determined By The Tribunal	As Adjusted To Conservatively Reflect The Dividends Fixed By The Tribunal
Yukos' equity value as of 21 November 2007 (millions)	[1]	\$61,076	\$57,222
Ratio of the RTS Index value on 21 November 2007 and 6-month average value to 30 June 2014	[2]	0.697908887	0.697908887
Claimants' total interest in Yukos	[3]	70.4965947960625%	70.49659479606250%
Claimants' contributory fault	[4]	25%	25%
Claimants' share of Yukos' equity value (millions)	[5]	\$22,537 [A]	\$21,115 [B]
<b>Conservative estimate of Tribunal's overstatement of Claimants' Damages (millions)</b>	<b>[6]</b>	<b>\$1,422</b>	

### Sources and Notes:

[1]: *See* Appendix B.1.

[2]: *See* Final Awards ¶ 1821.

[3]: *See* Final Awards ¶ 1816.

[4]: *See* Final Awards ¶ 1827.

[5]: = [1] x [2] x [3] x (1 - [4]).

[6]: =[5A] - [5B].