ATA Airlines, Inc. v. Fed. Express Corp.

United States Court of Appeals for the Seventh Circuit

November 2, 2011, Argued; December 27, 2011, Decided

Nos. 11-1382, 11-1492

Reporter
665 F.3d 882 *; 2011 U.S. App. LEXIS 25818 **

[*883] POSNER, *Circuit Judge*. ATA filed this diversity suit for breach of contract against Federal Express (which the parties call "FedEx," as shall we, even though it's actually a subsidiary of FedEx Corporation), and obtained a jury verdict in the exact amount it had asked for: $65,998,411. FedEx has appealed.

* * *

So ATA loses. But we do not want to ignore the jury's award of damages, which presents important questions that have been fully briefed and are bound to arise in future cases.

The award was based entirely on a regression analysis presented by an expert **[**17]** witness, a forensic accountant named Lawrence D. Morriss. FedEx objected to the admissibility of the analysis, citing *Rule 702(2), (3) of the Federal Rules of Evidence*, which when this case was tried conditioned the admissibility of expert evidence on the expert's having applied "reliable principles and methods . . . reliably to the facts of the case." The rule has been reworded slightly, effective December 1 of this year, but the Committee Notes state correctly that the changes are purely stylistic.

There were, as we're about to see, grave questions concerning the reliability of Morriss's application of regression analysis to the facts. Yet in deciding that the analysis was admissible, all the district judge said was that FedEx's objections "that there is no objective test performed, and that [Morriss] used a subjective test, and [gave] no explanation why he didn't consider objective criteria," presented issues to be explored on cross-examination at trial, and that "regression analysis is accepted, so this is not 'junk science.' [Morriss] appears to have applied it. Although defendants disagree, he has applied it and come up with a result, which apparently is acceptable in some areas **[**18]** under some models. Simple regression analysis is an accepted model."

This cursory, and none too clear, response to FedEx's objections to Morriss's regression analysis did not discharge the duty of a district judge to evaluate in advance of trial a challenge to the admissibility of an expert's proposed testimony. The evaluation of such a challenge may not be easy; the "principles and methods" used by expert witnesses will often be difficult for a judge to understand. But difficult is not impossible. The judge can require the lawyer who wants to offer the expert's testimony to explain to the judge in plain English what the basis and logic of the proposed testimony are, and the judge can likewise require the opposing counsel to explain his objections in plain English.

This might not have worked in the present case; neither party's lawyers, judging from the trial transcript and the transcript of the *Rule 702* hearing and the briefs and oral argument in this court, understand regression analysis; or if they do understand it they are unable to communicate their understanding in plain English. But a judge can always appoint his own expert to assist him in understanding and evaluating the proposed **[**19]** testimony of a party's expert. *Fed. R. Evid. 706*; *General Electric Co. v. Joiner, 522 U.S. 136, 149-50, 118 S. Ct. 512, 139 L. Ed. 2d 508 (1997)* (concurring opinion). If he worries that the expert he appoints may not be truly neutral, he can ask the parties' experts to agree on a neutral expert for him to appoint, as we suggested in *DeKoven v. Plaza Associates, 599 F.3d 578, 583 (7th Cir. 2010)*, and *In re High Fructose Corn Syrup Antitrust Litigation, 295 F.3d 651, 665 (7th Cir. 2002)*; see also Daniel L. Rubinfeld, "Econometrics in the Courtroom," *85 Colum. L. Rev. 1048, 1096 (1985)*. Also, the Federal Judicial Center has published a nontechnical "Reference Guide on Multiple Regression" written by Professor Rubinfeld, published in *Reference Manual on Scientific Evidence* 303 (3d ed. 2011). Had the district judge read the relevant portions of Rubinfeld's guide, he would have realized that Morriss's regression analysis was fatally flawed. Another good **[*890]** introduction to the use of statistical analysis in litigation is David Cope, *Fundamentals of Statistical Analysis* (2005).

The judge would have discovered in these or other sources that he might have consulted that a linear regression is an equation for the straight line that **[**20]** provides the best fit for the data being analyzed. The "best fit" is the line that minimizes the sum of the squares of the vertical distance between each data point and the line. (Why the squares rather than the simple distances is difficult to explain, and the jury can be asked to take it on faith.) A simple linear regression (that is, one involving only two variables—one the dependent variable, the variable to be explained, and the other the independent variable, the variable believed to explain the dependent variable) is easily visualized by plotting the data points on a graph. The regression line is a straight line that minimizes the aggregate of the squared vertical distances from the points to the line. The equation that generates that line can be written as $Y = a + bX + u$, where Y is the dependent variable, a the intercept (explained below), X the independent variable, b the coefficient of the independent variable (that is, the number that indicates how changes in the independent variable produce changes in the dependent variable), and u the regression residual—the part of the dependent variable that is not explained or predicted by the independent variable and the intercept, **[**21]** or in other words is "left over," like the change you receive after paying for a 99-cent item with a $1 bill.

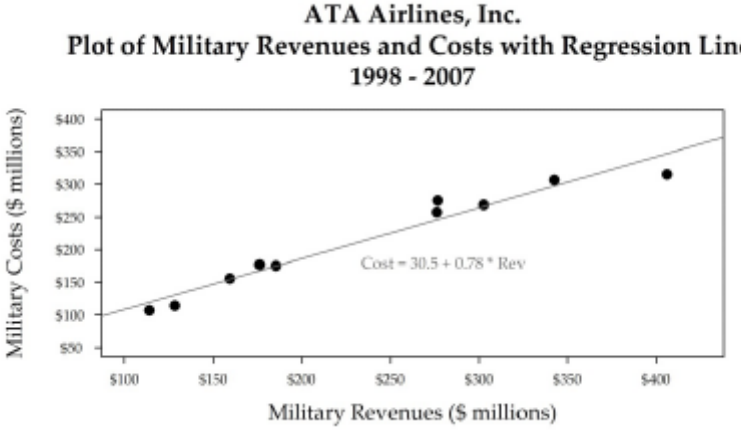
To illustrate below we graph a regression of salary (the dependent variable, on the vertical axis) on job experience (the independent variable, on the horizontal axis) for a hypothetical company. Each dot represents the salary and job experience of a particular employee. The intercept is the point at which the regression line crosses the vertical axis on the left side of the graph; it is thus the salary received by an employee who has no job experience at all. (Because a is 26.9, the model predicts that the starting wage of a new hire with no experience would be $26,900.) The slope of the regression line is the coefficient of the independent variable: it is a positive number because the more job experience a worker has, the higher his salary is likely to be. For example, b equals 2.2 in the graph, so the regression model predicts that a 1-year increase in job experience generates a $2200 increase in salary.

The relation between salary and job experience, although positive, varies from employee to employee. That is why not all the data points lie on the regression line, the straight **[**22]** line that fits the data best; the best fit is rarely a perfect fit. The variation in salary that the regression line does not explain is the regression residual, u in our equation.

[*891] Regression analysis is used to test hypotheses, in our example the hypothesis that more experienced workers get paid more (and how much more) depending on the amount of their experience. But it is also used to predict—for example that when a new employee accrues 10 years of experience he will be paid $22,000 more than his starting wage.

There is much more to regression analysis, even in the simple case in which there is only one independent variable; but we've now explained (and the judge could readily have understood from the FJC guide) enough to enable us to show why Morriss's regression analysis should never have been allowed to be put before a jury.

He used regression analysis to predict what ATA's military profits would have been had it not been dropped from FedEx's team **[the alleged breach of contract—ATA is claiming lost profits from FedEx's having kicked it off a group to service military contracts. PG.]**. In a graph that he prepared which we reproduce below, the dependent variable is ATA's annual costs of participating in the Civil Reserve Air Fleet as a member of the FedEx team and the independent variable is ATA's total annual revenues **[**23]** from that participation. There are 10 data points, each representing ATA's costs and revenues for one year from 1998 through 2007. As in our illustrative graph, the regression line in Morriss's graph slopes upward—when revenues rise, costs rise. Notice that the data points are closer to the regression line than the data points in our illustrative graph. This means that the regression line in his graph fits his data better than the regression line in our illustrative graph fits the data in that graph.



[*892] To calculate ATA's damages, Morriss needed to estimate its military revenues and costs for the second half of 2008 (after ATA withdrew from the team), and all of 2009, on the counterfactual assumption that the airline would have continued to belong to FedEx's team for the entirety of those two years rather than for just the first six months of the period. Morriss estimated that ATA's revenues for 2008 would have been $286.5 million, a figure he arrived at by multiplying the FedEx team's 2008 military passenger revenue of roughly $600 million by ATA's historical share of the team's annual passenger revenue. Plugging his revenue estimate into his linear regression (which, remember, treats **[**24]** costs as a function of revenues), Morriss came up with a cost figure of $253.8 million; and subtracting that from the estimated revenues yielded an estimated net profit for ATA in 2008 of $32.7 million.

Since FedEx was willing to keep ATA on the team throughout 2008, it is doubtful that the loss of profits that ATA experienced in the last half of 2008 by reason of its premature withdrawal can be blamed on FedEx. Yet Morriss believed that his inflated estimate of ATA's lost profits *underestimated* the loss in 2008 because the figure for costs that he used (and profits are revenue minus costs, so the higher the costs the lower the profits) included interest, taxes, depreciation, and amortization costs that he estimated amounted to $11.4 million in 2008. He thought these costs would not have been affected by the company's flying as part of the Civil Reserve Air Fleet that year, and so should not be deducted from revenues. There is some truth to this. Some of those costs may have been fixed, and if so were properly subtracted from the cost figure used to compute ATA's lost profits. Imagine that a firm has a fixed rental expense of $1 million a year, and unexpectedly lands a very profitable **[**25]** contract. Because the rental would have to be paid even if the firm had failed to obtain the contract, the rental expense would not be a cost allocable to the contract and so should not be subtracted in calculating the contract's profitability. Yet we'll see that elsewhere in his analysis he treated capital expenditures as current expenses, a treatment that fails to match costs and revenues, just as subtracting a fixed cost from the revenue generated by the contract in our example would fail to match costs and revenues.

[*893] Expunging the $11.4 million figure from Morriss's cost estimate increased his annual estimate of ATA's lost profits to $44 million for all of 2008. Last he assumed that ATA's profits would be identical in 2009, so he multiplied $44 million by 1.5 (to calculate lost profits for the period encompassing the latter half of 2008 and all of 2009) to yield a total lost profits estimate of $66 million. As we said, the estimate was excessive because it included ATA's profits in second half of 2008—the consequence of what appears to have been a self-inflicted wound.

But these were the least of Morriss's errors. His most glaring error was to use costs as his dependent variable and **[**26]** revenues as his independent variable. The dependent variable as we know is a number sought to be explained by the independent variable, as in any equation. In the equation $Y = bX$, the effect of X on Y is quantified by its coefficient, b; so, for example, if b is 3, then Y is three times larger than X.

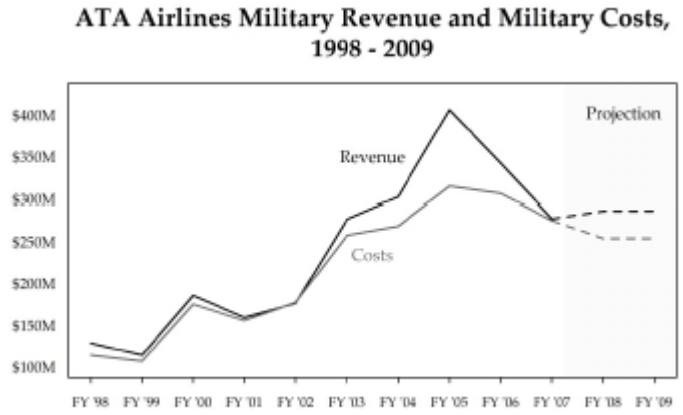
But revenue does not influence cost directly; nor is it clear that it is closely correlated with unmeasured variables that do influence costs. An increase in revenue may be correlated with an increase in cost—and indeed is likely to be if the increased revenue is the result of increased sales, but not if it is the result of selling the same output at a higher price. Increases in total costs are driven by increases in component costs—labor, materials, and so forth—not by revenues. What is true is that if revenues plummet, the firm will try to cut its costs in order to minimize the losses caused by the drop in revenues. But to the extent

that those costs are fixed, it may not be able to cut them in time to avoid bankruptcy—which is what happened to ATA in 2008.

Morriss tried to justify his explaining cost by revenue, rather than by more plausible variables such as fuel, maintenance, and labor **[**27]** costs, on the ground that such information was unavailable. It is hard to believe this, because the information must have been recorded by ATA's accountants—how else could they have prepared a balance sheet and income statement for the company? In any event a plaintiff's failure to maintain adequate records is not a justification for an irrational damages theory.

Even if we assumed that Morriss's model were built on a rational foundation, we would have to reject its results because the model was improperly implemented. In 2007, the last full year in which ATA participated in the Civil Reserve Air Fleet, its profits were a minuscule $2.1 million. If it would have had the same profits in 2008 and 2009 had it not been dropped from FedEx's team, its total damages would have been only $3.15 million during the 18 months remaining in 2008 and 2009, rather than the $66 million that ATA asked for and the jury awarded (to the dollar). $2.1 million is only 6.4 percent of the $32.7 million profit that Morriss's regression analysis predicted that ATA would have earned the following year (as well as the year after that) had ATA not been dropped from the team. (The $32.7 million is the profit before **[**28]** the adjustment for the so-called fixed costs of $11.4 million. The adjustment was not carried into the calculation of ATA's 2007 profits, which is why we are expressing those profits as a percentage of the predicted profit for 2008 and 2009.)

The following graph, based on one prepared by Morriss and admitted into evidence, exhibits the fallacy of his prediction. (We are not clear why his graph was truncated at 2002, since ATA had joined the FedEx team earlier and the record provides sufficient data to extend the graph to 1998, as we have done.) The top line is **[*894]** ATA's annual military revenues; the lower line is its annual costs; the vertical distance between the two lines measures the company's profits from its military business. We see that revenues rose sharply from 2002 to 2005, then plummeted in 2006 and 2007. Costs rose more gently, and fell more gently, over the 2002-2007 period, and in 2007, the last year for which there are data, the two lines almost intersect—it was because revenues were so close to costs that profits were so meager that year.



Morriss predicted that ATA's military revenues would have risen in 2008 and 2009 while its costs would have continued to fall. The difference **[**29]** between his estimated revenues and his estimated costs is the $66 million in (imagined) lost profits. Remember that Morriss's regression model, which is based on historical data (20022007), found a positive relation between revenues and costs: when revenues rise, costs rise, and when revenues fall, costs fall. Remember too that he used the model to predict that ATA's

costs would have continued to fall in 2008 and 2009 (the lower dashed line), even as revenues rose. It's this divergence in directions that turns a modest predicted growth in revenues into a large growth in profits.

What produced this odd result—costs falling as revenues rise—is that ATA's costs had increased much more slowly than its revenues between 2002 and 2005, resulting in big profit margins. To predict a comparable (though somewhat smaller) profit margin in 2008 and 2009 (and thus produce a big lost-profits estimate), when the uptick in revenues was expected to be much smaller than it had been between 2002 and 2005, Morriss had to make costs in those years fall. But for ATA's costs to fall as its revenues rose would make no economic sense, as well as being inconsistent with Morriss's underlying assumption that costs **[**30]** are a positive function of revenues—that if revenues rise costs rise and if revenues fall costs fall. That costs rise more slowly than revenues does not imply that costs drop when revenues increase slowly. No mechanism for such a reversal is suggested, and revenues and costs had never moved in opposite directions during the preceding decade in which ATA had actually been operating.

Morriss tried to explain away the embarrassingly minuscule profits that ATA earned on its military business in 2007 as a fluke: the carrier, he said, had experienced "nonrecurring" costs that year. The costs in question were the costs of acquiring **[*895]** new aircraft. They were indeed nonrecurring costs, but they were not 2007 costs; they were capital expenditures, which is to say expenditures expected to increase revenues or reduce costs over a period of more than a year, and thus beyond the year in which the expenditures were made. If a business buys a piece of equipment in year 1 for $1 million that will be usable for 10 years and will then be scrapped, to treat this as a $1 million cost in year 1 and a zero cost in each of the nine subsequent years would create a misleading picture of the firm's profits through **[**31]** time. Costs should be matched with revenues to provide an accurate year-to-year picture of profitability. This is done by amortizing (spreading) a capital expenditure over its useful life. In the case of our hypothetical $1 million asset, this would require assigning costs of $100,000 per year to each year of the asset's useful life. If that were done here, Morriss's estimate of lost profits in 2008 and 2009 would have been lower than it was, because some of the nonrecurring costs incurred in 2007 would have been reallocated to those years.

Another mistake Morriss made was to model the relation between cost and revenue as a straight line, as if, for example, ATA's costs were always exactly 75 percent of its revenue (producing the linear regression equation $c = .75r$), in which event the company would turn a 25 percent profit every year. Yet its actual profit margins, as shown in the next graph, fluctuated between 0 and 25 percent of total revenue.

Still another mistake was Morriss's basing a prediction of what ATA's costs would have been in 2008 and 2009 (had it remained a member of FedEx's team) on a tiny sample—10 observations, each consisting of ATA's costs in one of the 10 years on **[**32]** which the regression analysis was based. Small samples are less representative of the population being sampled than large ones. The population here would be the entire cost experience of ATA and similar air carriers.

Confidence intervals (familiar as the "margins of error" reported in predictions of election outcomes) are statistical estimates of the range within which there can be reasonable confidence that a correlation or prediction is not the result of chance variability in the sample on which the correlation or prediction was based; 95 percent confidence is the standard criterion of reasonable confidence used by statisticians. Consider our hypothetical regression **[*896]** of wages on experience. A regression based on a sample of 10 workers would yield a less precise prediction of what the average relation of wages to experience was for the workers in a plant that had 1000 workers than a regression based on a sample of 50 or 100 of the workers.

The 95 percent confidence interval for Morriss's prediction of ATA's 2008 costs was correctly calculated in the report of FedEx's expert to be $90 million. This means that Morriss's estimate that ATA would have costs of $254 million was the midpoint **[**33]** of a range from $299 million at the top ($254 million + $90/2 million) to $209 million at the bottom ($254 million - $90/2 million)—and if its costs were at the top of the range the result would have been a $12.5 million annual net loss for ATA rather than Morriss's predicted $32.7 million profit (before the adjustment for fixed costs). All else aside, the confidence interval is so wide that there can be no reasonable confidence in the jury's damages award.

All this is not to say that it would be a surprise if ATA had lost profits as a result of its expulsion from the FedEx team, although its nonmilitary business was collapsing and it is doubtful that it could have survived purely on its military business. But the only quantification of damages presented at the trial was based on Morriss's regression, and as a result there was a failure of proof of damages. It is not enough to prove injury in a damages suit; the plaintiff must prove an amount of damages and ATA failed to do that.

This is not nitpicking. Morriss's regression had as many bloody wounds as Julius Caesar when he was stabbed 23 times by the Roman Senators led by Brutus. We have gone on at such length about the deficiencies **[**34]** of the regression analysis in order to remind district judges that, painful as it may be, it is their responsibility to screen expert testimony, however technical; we have suggested aids to the discharge of that responsibility. The responsibility is especially great in a jury trial, since jurors on average have an even lower comfort level with technical evidence than judges. The examination and cross-examination of Morriss were perfunctory and must have struck most, maybe all, of the jurors as gibberish. It became apparent at the oral argument of the appeal that even ATA's lawyer did not understand Morriss's analysis; he could not answer our questions about it but could only refer us to Morriss's testimony. And like ATA's lawyer, FedEx's lawyer, both at the trial and in his appellate briefs and at argument, could only parrot his expert. FedEx's expert did not testify; as is common in damages cases, the defendant offered no alternative measure of damages, doubtless fearing that the jury would take that as a signal to split the difference—finding liability but awarding the plaintiff less than the plaintiff asked for—rather than struggle to understand an incomprehensible case. Both because **[**35]** FedEx tendered no estimate of damages and because neither Morriss nor the lawyers nor the judge presented an intelligible damages analysis to the jury, it is no surprise that, having decided that ATA should win, the jury simply awarded the exact figure that ATA had asked for in damages.

If a party's lawyer cannot understand the testimony of the party's own expert, the testimony should be withheld from the jury. Evidence unintelligible to the trier or triers of fact has no place in a trial. See *Fed. R. Evid. 403*, *702*.

The judgment is reversed with instructions to dismiss the suit with prejudice.

REVERSED.

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