**Title**:  Statistical analysis for the frequencies of Federal judges' assignment to the cases filed by Mr Loring N. Spolter for the period 1996-2009

**Author**: Dragan Radulovic PhD., 10042 Lexington Estates , Boca Raton FL 33428, radulod@aol.com

**Summary**: This report offers a statistical analysis of the Federal judges' assignment data, provided to us by Mr Loring Spolter. Federal judges should be assigned by a random blind process which in turn would result in specific types of frequencies associated with each judge. We analyzed the data and with very high confidence we can state that deviations from these frequencies could not be produced by blind random assignment. In particular, during the last three years, the frequency of the assignments of a judge with code "WJZ" deviates in a highly unusual way. We conducted several statistical tests and in each case, with confidence higher than 99.9% we concluded that random blind assignment was jeopardized.

**The Data:** We collected 119 cases filed at South Florida Federal court during the last 15 years; for 91 of these cases Mr Spolter represented plaintiffs and in 27 cases he represented defendants. In our opinion these data are collected in fair and professional way, with only one missing point (for one of the 119 files we could not obtain the required details)

**Conclusion**: We believe that the frequent occurrence of the judge "WJZ" represents an anomaly. This anomaly, although theoretically possible, is highly unusual. Using the language from mathematical statistics, we can conclude, with at least 99.9% certainty that the mechanism responsible for judges' distributions was not random blind assignment.

**Method 1.** *Visualization*.

We extracted the data for the seven judges with the most frequent appearances. The remaining 18 judges appeared only 4 times or less during the last 15 years and for this reason we are not including them. Next we calculated the 36 months-moving averages relative frequency for each of the seven most frequent judges. More precisely, for each 36-months period we computed the ratio of the number of assignment for a particular judge over the total number of cases for that particular 36-months period.

As it could be seen from Display 1, judge with the code "WJZ" exhibit an "unusual" spike for the last 36 months.

Display 1
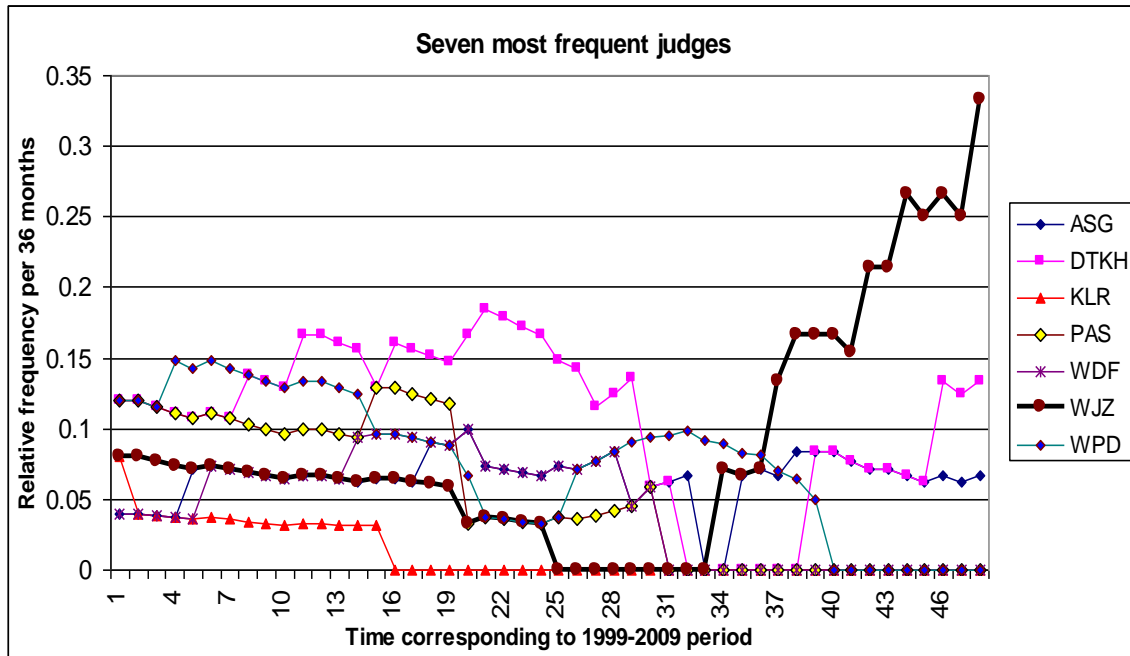


**Method 2**. (*Binomial distribution*)

During the last 36 months, Mr. Spolter has filed 15 cases, 5 of which had been assigned to judge "WJZ". This rather large frequency "5 out of 15" is the very reason for the unusual spike on the above display. The above graph, although very instructive does not mathematically quantify how probable (or rather how improbable) is for a blind random assignment of judges to exhibit such an unusual behavior. For this we need to employ the methods from mathematical statistics:

*Assumptions*: We will assume that the mechanism that assigns the judges is fair and random. We will also assume that at any moment during the last 36 months, there were circa 20 federal judges to choose from.

The formula to compute the probability that a random blind system with **n judges** would produce the frequency "5 out of 15" (or more) is given by:

$$P = \sum_{k=5}^{15} C_{15,k} \left(\frac{1}{n}\right)^{k} \left(1 - \frac{1}{n}\right)^{15-k}$$

If we conservatively assume that there are only 20 available judges to choose from this probability becomes: 0.0006. In other words it is very unlikely that a fair system with 20 judges on the bench could produce such an outcome. Using the language of mathematical statistics, we conclude with **99.94** percent certainty that one should reject the hypothesis that the judges' assignment followed "blind random procedure"

One of the possible criticisms for the above Bernoulli method relates to our inability to pinpoint the exact number of judges available. Our data as well as public records suggest that there are 24 or more judges available, but there are some exceptions. During the last 15 years some judges have lighter caseload, some judges might be on a sick leave or involved in a long time-demanding cases. Thus, one cannot conclusively state that we always had 20 judges available. Nevertheless, "5 out of 15" frequency is indeed very unusual even if we assume considerably fewer judges on the bench. In order to demonstrate this we included a whole range of possibilities; we computed the probabilities for a hypothetical number of judges varying from **n=16** judges up to **n=20** judges, and for each case we get a very high level of certainty.

Table 2

| Total number of judges | probability | certainty |
|---|---|---|
| 16 | 0.0017 | 99.83% |
| 17 | 0.0012 | 99.87% |
| 18 | 0.001 | 99.90% |
| 19 | 0.0008 | 99.92% |
| 20 | 0.0006 | 99.94% |

*Comment*: In short, even in the extreme case in which we assume that through the last three years there were only 16 federal judges assigned to the cases, the outcome "5 out of 15" is still a highly improbable event.

**Method 3**. (Proportion t-test)

Another way to independently address this issue is to compare the frequencies of appearances of judge "WJZ" in two situations:

- *Cases for which Mr Spolter represented plaintiffs*

- *Cases for which Mr Spolter represented defendants.*

If indeed a random blind method was used then the frequencies of judges' appearances should not depend on who filed the charges. We collected the data for the last 15 years (1996-2009) and we have 91 cases for which Mr Spolter filed the claim and in 11 of these cases the assigned judge was WJZ. As a contrast, there are 27 cases filed at the court for which Mr Spolter represented the defendant (and thus he did not file the claim), and only once was judge WJZ assigned. We offer Figure 3 as a visualization tool:

Figure 3
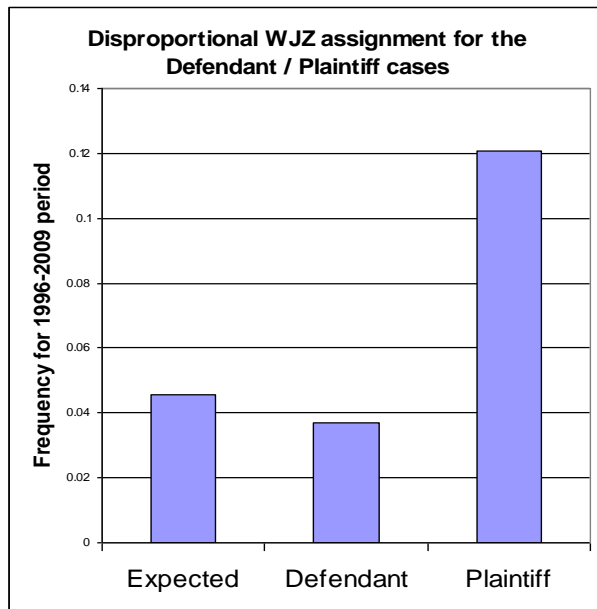


It is clear that frequency "one in 27" for which judge WJZ was assigned to the cases filed by other lawyers (since Mr Spolter represented the defendants) is within reasonable expectations; we have circa 20 judges to choose and the outcome "one in 27" seems reasonable. On the other hand, the frequency of 12% for the WJZ assignments when Mr Spolter represented the plaintiffs is almost triple of the expected frequency and this unusual number raises some concerns.

The proper mathematical way to address how "unusual is this occurrence", is to conduct the proportion t-test:

*Hypothesis*: With 20 judges on the bench, if the blind random system is used, the expected frequency for WJZ assignment should be "one in 20".

T score is computed by the formula:

$$t = \frac{\left(\dfrac{11}{91} - \dfrac{1}{20}\right)\sqrt{91}}{\sqrt{\dfrac{1}{20}\left(1 - \dfrac{1}{20}\right)}} = 3.102 \quad \text{which translates to 99.903 certainty (i.e. p-value is 0.00097)}$$

Thus the conclusion, using the language of mathematical statistics is: with a certainty higher than 99.9% we can reject the hypothesis that judges assignment of the cases were produced by blind random assignment with the expectation of "one in 20 judges".