COOPER
MEDIATION INC

LIES, DAMNED LIES AND STATISTICS[1]

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While I was not necessarily the strongest student in mathematics through high school (I would have never had the courage to attempt any form of university level mathematics), my experience as a mediator has demonstrated the power and persuasion of numbers. There can be no doubt that a series of well planned and sequenced numbers offers a strong form of communication in the course of negotiation. Facility with and expertise of mathematical concepts applicable to personal injury and insurance claims (be that present value calculations or otherwise) are vitally important when assessing and negotiating claims of this nature.

As a mediator, I formed some empirical thoughts or impressions as to how negotiations proceeded within a mathematical construct. My "seat-of-the-pants" beliefs were:

a) Counsel for a plaintiff or claimant typically demands 2, 3 or 4 times that which they hope or expect to receive by way of settlement;

b) Defence counsel or counsel for an insurer typically offers ½, 1/3 or ¼ of the ultimate amount they expect to pay to achieve settlement; and

c) If the defence opening offer is 10% or more of the plaintiff's opening demand, the case has a probability of settlement.

I confess that this impression is informed, to a large extent, by my need to remain optimistic in the face of very high demands or very low offers. As a simple example, if the plaintiff demands $100.00, I mentally peg the plaintiff's settlement range in the order of $25.00 to $50.00. Similarly, when the defendant makes an opening offer of $10.00, I mentally put their expected settlement range in the order of $20.00 to $40.00. While it is a rare day where the defence is prepared to pay more than the plaintiff is prepared to accept, this approach allows me to remain optimistic in the face of what appear to be very extreme positions.

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[1] This phrase was popularized in the United States by Mark Twain, who attributed it to the 19th Century British Prime Minister, Benjamin Disraeli: "There are 3 kinds of lies; Lies, Damned Lies and Statistics". It has been used to describe the persuasive power of numbers, particularly the use of statistics to bolster weak arguments. It has also been used to doubt statistics used to prove an opponent's point.

My opening, at the commencement of mediation, typically incorporates a comment to the effect that I am optimistic that the matter will settle. This is due, in part, to my nature and, in part, to my job description. [If I don't believe the case is capable of resolution, why would the parties or their counsel believe this to be the case?] I believed, at that time, that the substantial majority of the matters that came before me for mediation did indeed settle. A comment made by particularly vocal and strident counsel at one of my mediations prompted me to probe deeper into this area.

On one such occasion, this un-named lawyer quickly interjected and said something to the effect of, "You mediators are all the same. You tell us that 90% or more of your cases settle at mediation. In my experience, I am lucky to settle 50% of my cases at mediation". I cannot recall if I replied with my inside voice or my outside voice but my thought was, "Perhaps this says more about you or your style of negotiation at mediation than about the mediation process or the mediators with whom you work." I cannot recall if we were able to settle this matter or not but I left the mediation thinking about the exchange and wondering as to whether my seat-of-the-pants thought was accurate.

Over the course of approximately 13 months, I recorded data in relation to almost 230 mediations. The substantial majority were full day mediations but there was a strong collection of half day mediations. Some of the cases were 2-party cases (typically, a plaintiff or claimant and a responding insurer (BI, AB or LTD)). If there were multiple claims (for example, as against BI and AB and / or LTD insurers), this was treated as two or three mediations (since each claim could settle independent of the other). If the plaintiff's claim was against multiple defendants (for example, a multi-vehicle car accident), this was treated as one mediation.

I recorded the date of mediation, date of loss (if applicable), whether the matter settled or not, opening demand[2] [as made by the plaintiff or claimant], opening offer [as made by the defendant or insurer], final demand (if the matter did not settle), final offer (if the matter did not settle) and the settlement amount (if the matter did settle).

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[2] Traditionally, the plaintiff or claimant makes the first offer (which I describe as a demand). In most cases, this number of consists of one or more heads of damages and is usually presented "plus applicable interest, costs and assessable disbursements". The number which I recorded was calculated in this manner (so that the actual size of the opening demand would have been greater). In those cases where the opening demand included interest and/or costs and/or assessable disbursements, then the number was recorded in this fashion. I attempted to ensure that when recording the opening offer made by the defendant or insurer in response to opening demand, the figure was calculated on a comparable basis (so that I was able to compare "apples to apples").

In an appreciable but small percentage of the mediations, there was a "failure to launch". By this, I mean that in some cases, the content of the brief or something said by counsel before or during the general session of the mediation made it clear to the other counsel that settlement was not going to occur at mediation and, as a result, one party or the other refused to make an opening demand or offer as the case may be. In some cases, the plaintiff made an opening demand which was met with an opening offer of nil dollars and was told, through me and with permission, that the defence did not see the plaintiff's claim as having any merit or dollar value for settlement.

I struggled as to whether to incorporate data in relation to these "failure to launch" mediations in my analysis. Some of my mediation colleagues felt that the refusal of one side or the other to engage in a negotiation did not constitute a mediation. Other of my colleagues felt that once the parties and their counsel arrive at and embark on a mediation, it is the mediator's responsibility to get the parties to engage in a negotiation and if the matter does not settle, this occurs on that mediator's "watch". Given that I have had some occasions where I have been able to move one side or the other from an extreme or potentially entrenched position, I felt the appropriate thing to do was to incorporate all of the mediations [launched or otherwise] in the analysis.

In the final analysis, when I looked at all mediations, I found that 73.3% settled. If I excluded the "failure to launch" mediations, then the settlement rate increased beyond 80%.

However, I was much more interested in the relationship between opening demands and opening offers as it might relate to the actual settlement amount and the ability of the parties to achieve settlement. As a result, I engaged the services and assistance of Adam Spinks (who has an educational background in statistics and computer science) to review and analyze the data and advise me as to whether there was a statistical basis for my beliefs and impressions. I have attached Adam's paper for those with a statistical bent or interest.

According to the analysis performed by Mr. Spinks, there is a general trend that cases tend to settle for approximately 30% of the opening demand. This percentage may be somewhat misleading and inflated since the opening demand is typically calculated without regard for pre-judgment interest, costs or disbursements whereas the final settlement amount tends to be recorded as a sum that is inclusive of interest, costs and disbursements. According to Mr. Spinks, the general rule of 30% does not apply to settlements at very low or very high dollar levels.

When examining settlement values as a function of the opening offer, there is a general trend that settlement is achieved at about 200% to 250% of the opening offer.

Mr. Spinks developed two equations to predict settlement values (whether from an opening demand or from an opening offer). Please refer to figure 4 and his discussion in that regard at pages 5 – 6 of the appended paper.

At the risk of grossly oversimplifying Mr. Spinks' detailed and thoughtful analysis, I met with him after he prepared his paper and asked him to "dumb it down" for me (imagine a yellow book titled "Statistics for Dummies"). From this discussion and to the best of my powers of understanding, Mr. Spinks' analysis of the data is as follows:

1. There is a strong relationship between both opening demands and opening offers and the resultant settlement amount;

2. Settlement demands are more predictive in relation to the settlement amount than opening offers.

I confess that Mr. Spinks made a great number of further points by way of explaining his paper. Despite my best efforts to understand the points, make some notes and attempt to explain them in this paper, I am at a loss to do so.

However, from what I can recall and understand from my meeting with Mr. Spinks, he did confirm one of my beliefs: When the opening offer is less than 8% of the opening demand, a settlement is very difficult to predict. To my mind, this accords with my belief that when the opening offer is less than 10% of the opening demand, settlement is less likely to occur.

LESSONS LEARNED:

1. Despite very high opening demands and very low opening offers (approaching a 10:1 ratio), almost 75% of such claims will settle.[3]

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[3] Why plaintiffs believe it necessary to demand 2, 3 or 4 times the ultimate settlement amount or why defence counsel feel it necessary to offer a very small fraction of the amount they intend to pay to achieve settlement is a topic best left to another day/paper.

2. I should have paid greater attention to my math teachers in high school, should have taken more than simply Functions and Relations in grade 13 and should have taken a university level statistics course.

Mediation Analysis

Adam Spinks

Introduction and Methodology

The Data

For the following analysis, I focused solely on cases that had settled, and had complete data. I then removed outliers as described in the outlier log.

Opening Demand and Opening Offer

The obvious place to look for trends in the data was in the direct relationship of Opening Offer (OO) and Opening Demand (OD) on the Settlement (S) value. Figure 1 depicts the opening demand, opening offer, and settlement values for every case (sorted in ascending order for settlement amount). A quick visual analysis suggests that there might be a strong relationship present.

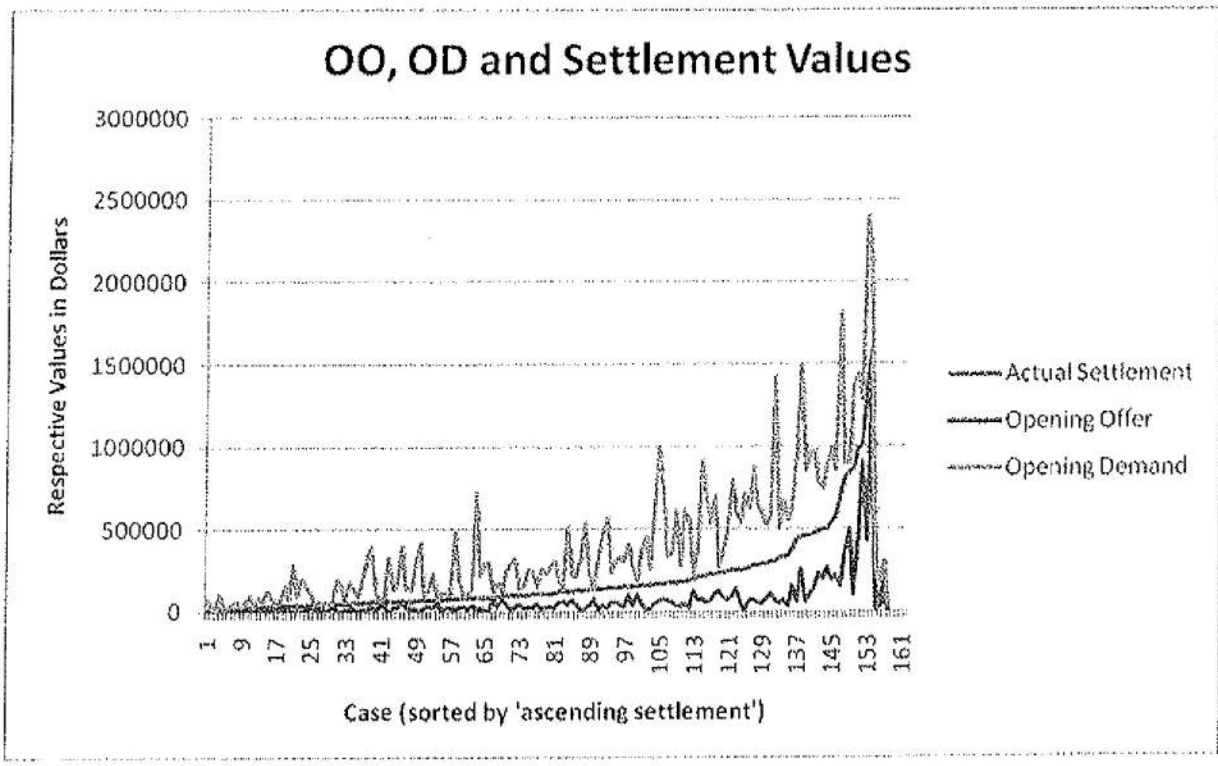

FIGURE 1

In Figure 2, you can see the Opening Offer represented as a percentage value of the Settlement amount. This indicates that, in general, the opening offer is approximately 30% of the settlement amount. However, since the settlement amount increases along the x-axis, it seems that at for very low settlements and very high settlements, the general rule of 30% does not hold.

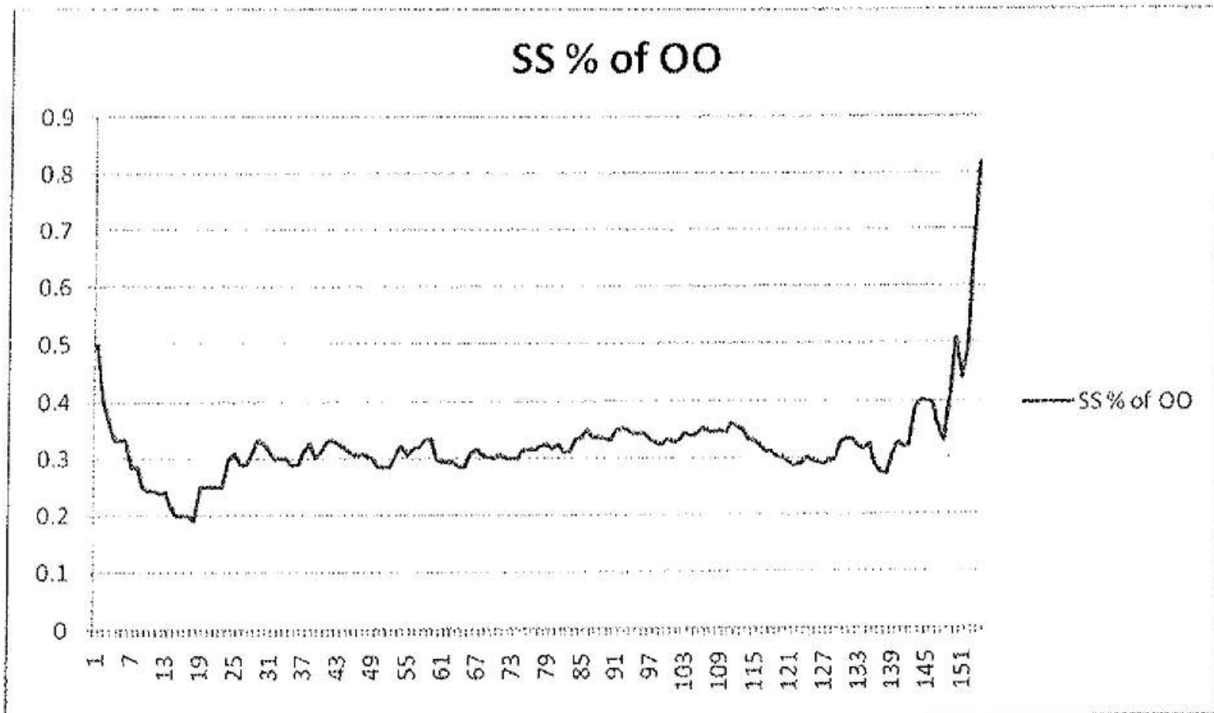

FIGURE 2

Figure 3 depicts the same relationship, except between settlements (SS) and OD. The results are less consistent than those found for OO. Once again, the trend becomes volatile at either end of the settlement amount spectrum. Aside from that inconsistency, it appears that a general increasing trend can be observed from approximately 200% to 250%. This distribution suggests non-linear relationship between SS and OD.

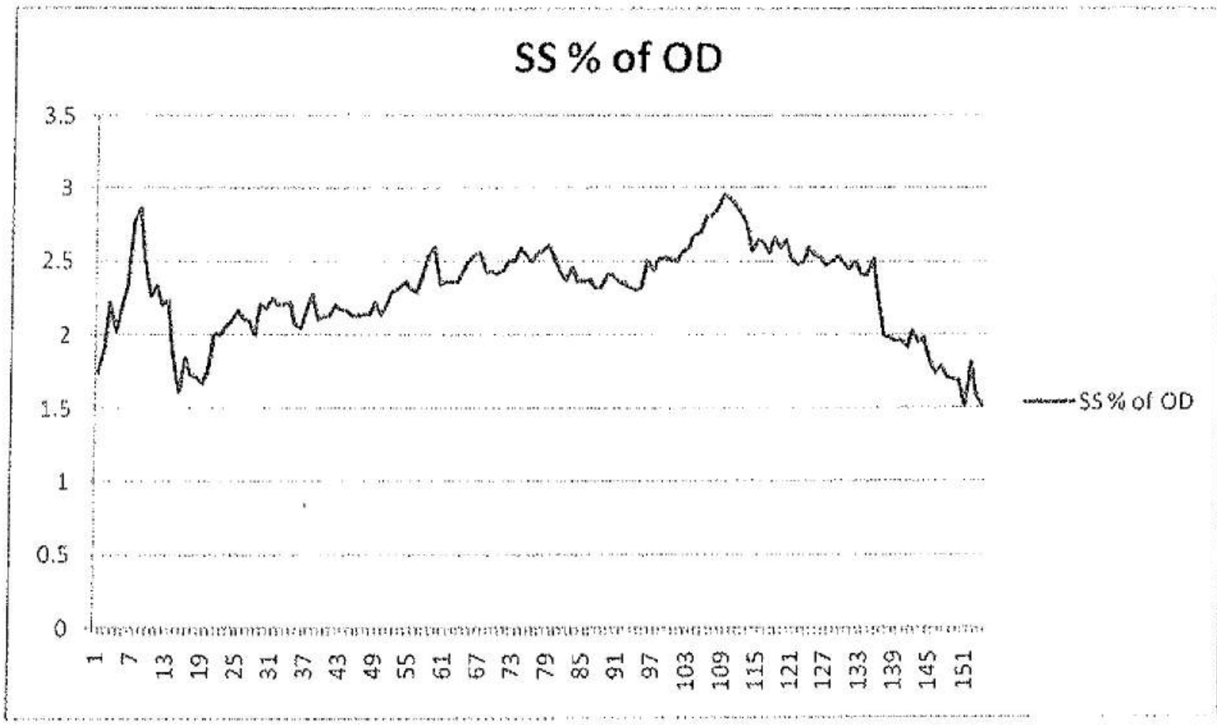

FIGURE 3

Figure 4 is a plot of Opening Demand and Opening Offer versus Settlement. Both attributes have lines of best fit associated with them. I chose a simple quadratic relationship, since the previous graphs suggested a non-linear relationship, and higher polynomials did not improve results. R^2 is a statistical measurement that represents the proportion of variability that is captured by the line of best fit. Higher values of R^2 indicate a better fit, and a more accurate representation of the underlying data. In Figure 4, OO's line of best fit has a higher R^2 value than OD's. This probably means that in our data, Opening Offer has a stronger relationship with Settlement. However, both have high R^2 values, which indicate that both OO and OD have a strong relationship with Settlement.

The equations listed are of the line of best fit. They represent the method of mapping OO, or OD values to a settlement value. For example, the equation of OO's line of best fit is $y=-0.000001x^2+2.5162x+33906$. This means that for a given value Opening Offer, taken to be x, it will equate to a predicted settlement amount. My goal is to find the strongest R^2 value, such that the equations generate the most accurate predictions based on the inputs.

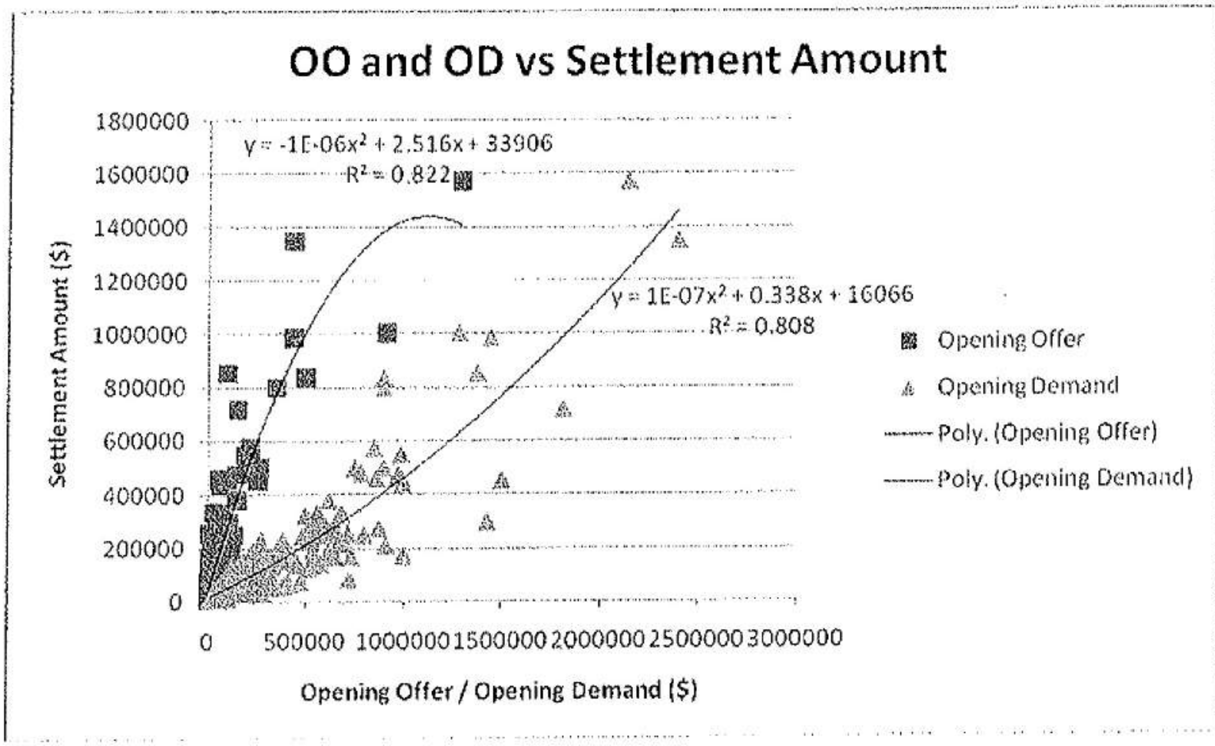

FIGURE 4

Using the equations given in Figure 4, I calculated the predicted settlement values. I then averaged them, to give me a prediction that was generated from both OO and OD. So, for example, if OO was 10000, and the predicted settlement based on that value was 30000, and OD was 80000, its predicted settlement was 35000, I took the average of the two numbers (30000 and 35000), 32500. I then plotted this averaged amount against the initial settlement (Figure 5). The R^2 value was significantly higher in the OO-OD average, than in the original values or than in either of the individual predicted values alone. I tried numerous weighted averages (rather than just a 50/50 split), but none showed a significant improvement on the equally weighted average. I then took the equation of the line of best fit of these values [$y=1.1238x - 22983$], and substituted the averaged amount in for x. Thus, the final equation looks like this:

PredictedFromOO = -0.000001**OO*^{2} + 2.5162**OO* + 33906

PredictedFromOD = 0.0000001**OD*^{2} +0.3382**OD* +16066

AveragedPrediction = (PredictedFromOO+PredictedFromOD)/2

PredictedFromAveragePrediction = 1.1238*$AveragedPrediction$ - 22983

I call these set of equations **Equation 1.**

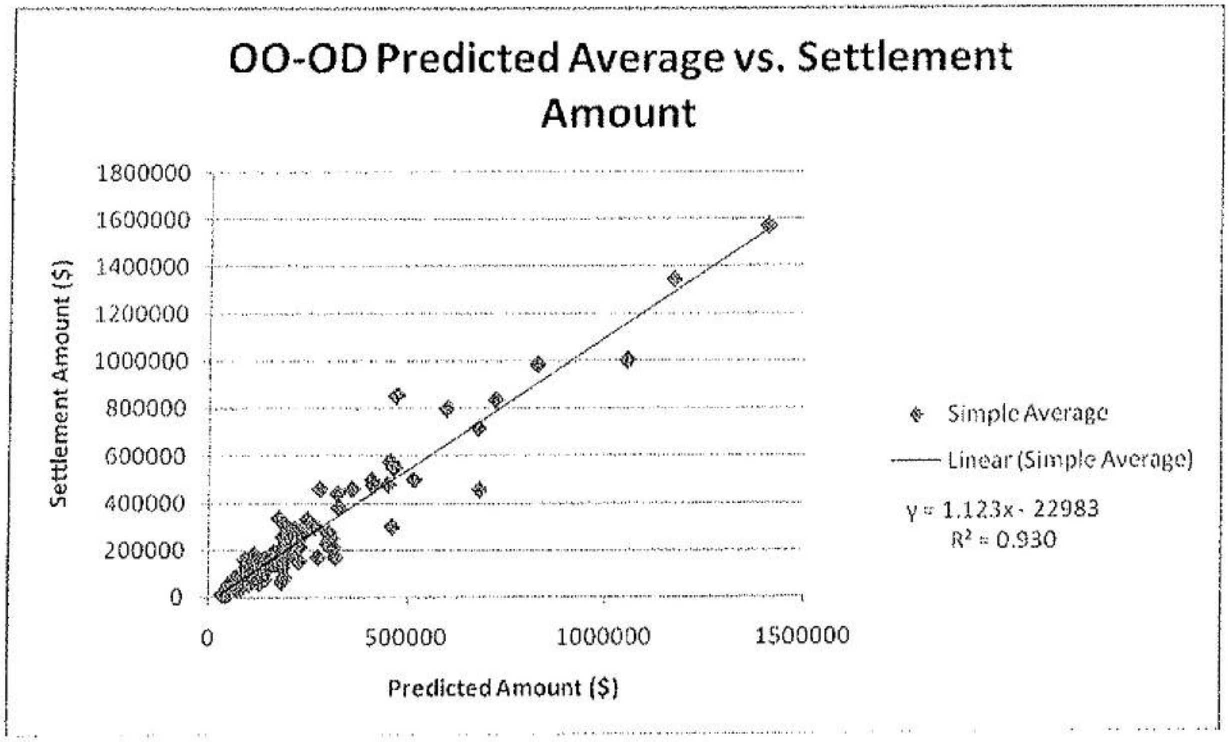

FIGURE 5

OPENING DIFFERENCE

I also analyzed the relationship between the Opening Difference (OD minus OO) and Settlement Difference (OD to SS or OO to SS). Figure 6 shows these results. It's clear from the R^2 values that the difference between Settlement and Opening Difference is the more useful heuristic. I took the line of best fit from the OD-OO difference, and tested its efficacy in predicting settlement difference. Substitute OD-OO into $y = 0.6472x+933.66$, the resultant value is the estimated difference between the Opening Demand and the Settlement, so you must then subtract this value from OD to get the estimated Settlement amount (**Heuristic** 2). This turned out to be just as useful a heuristic as was Heuristic 1.

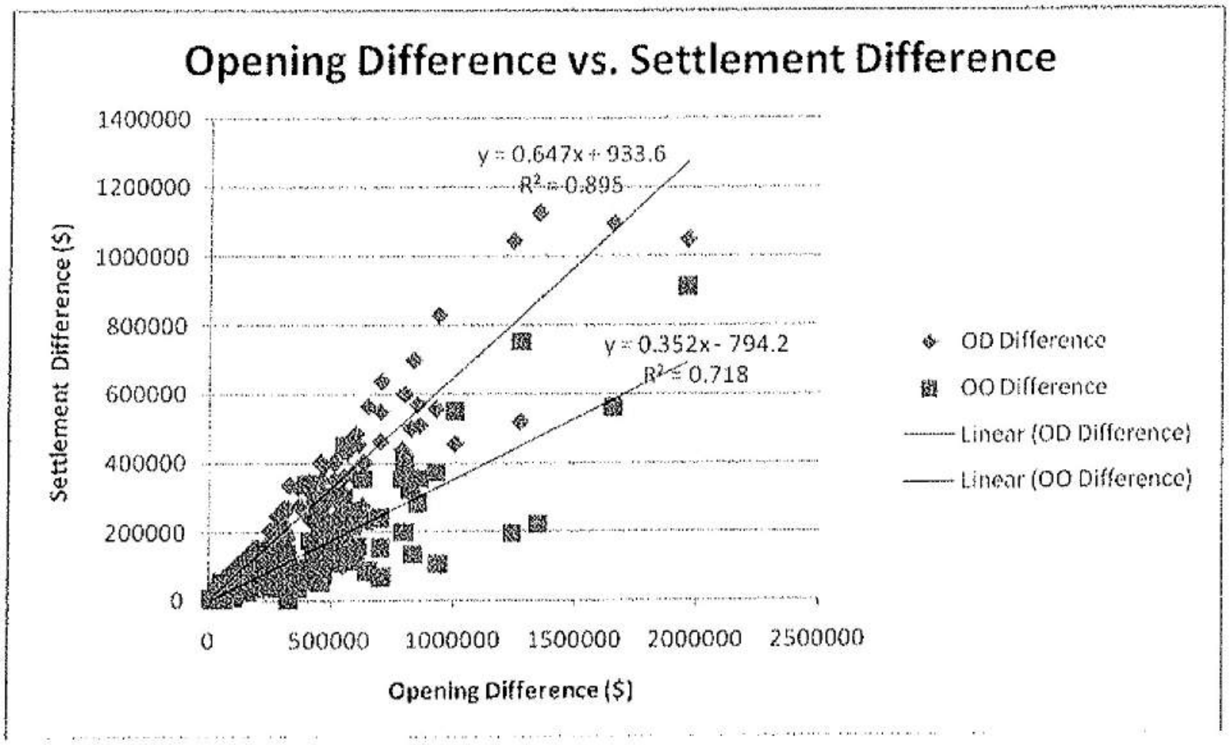

FIGURE 6

Finding the Best Predictor

I plotted three different heuristics: Equation 1, Equation 2, and a weighted average of both.

Though it is hard to read, all three predictors had significantly high R^2 values, but the highest went to the OO-OD average heuristic with an R^2 of 0.9304, followed by the combination heuristic with 0.9203 and finally the OD difference heuristic with 0.9096. At this stage in the analysis, it seems that the OO-OD average is the best heuristic for determining the settlement.

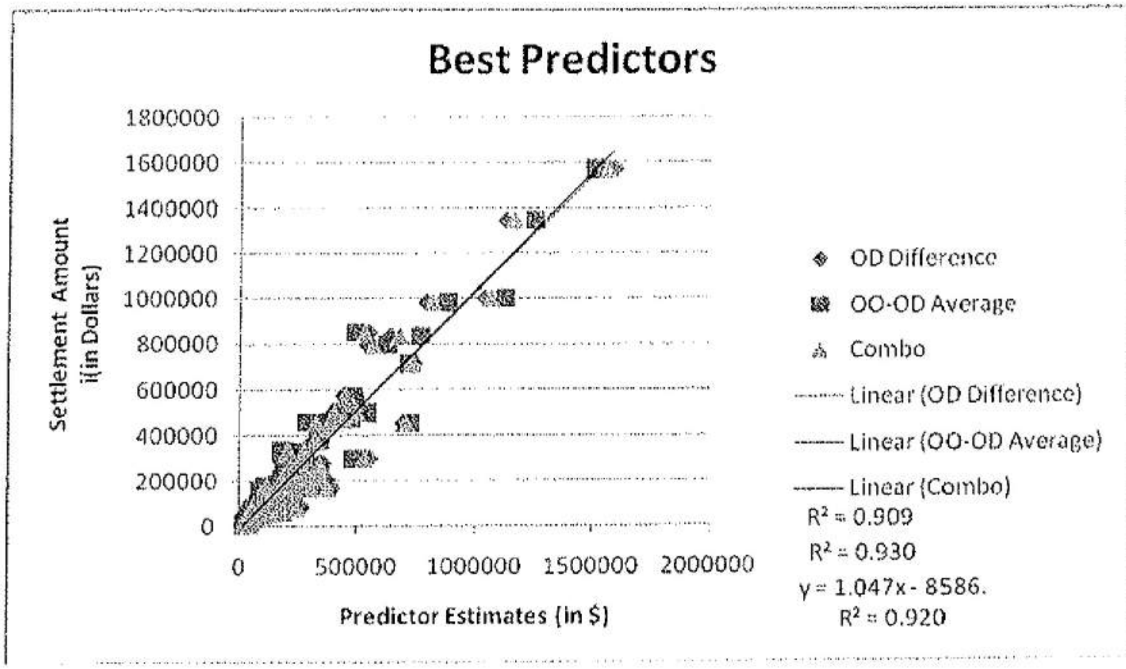

FIGURE 7

RETESTING THE DATA

Before making any conclusions, I hoped to find a better result by filtering out some of the noise in the data. Figure 8 is a plot of the ratio OO and OD versus the margin of error made by the predictive heuristics. As you can see, there are a significant number of errors over 100% towards the left of the graph. This indicates that when the Opening Difference Ratio is very low (*ie: the Opening Offer is less than approximately 8% of the Opening Demand*), the efficacy of the heuristics becomes significantly worse. This scenario occurs a significant amount of the time and is not something that can just be ignored; however, a separate model should be developed to accurately model scenarios wherein the Opening Difference Ratio is not so low.

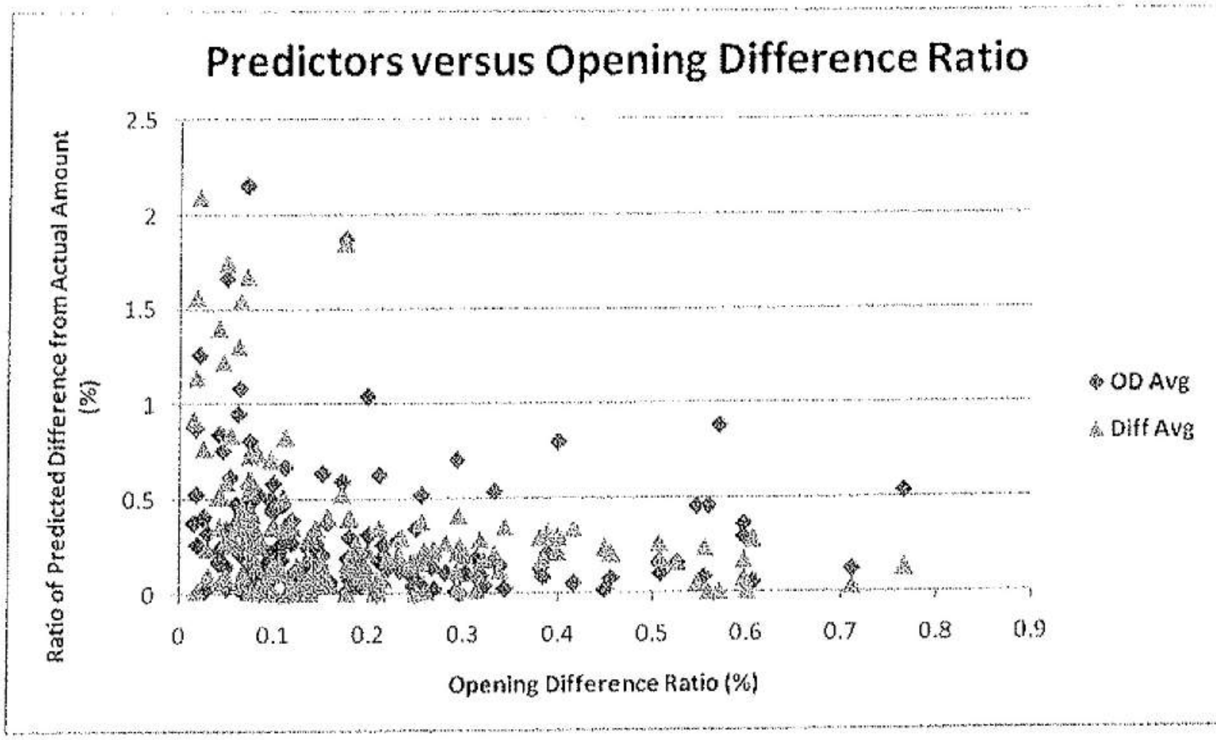

FIGURE 8

Below is a graph of the adjusted data, wherein all records with an OO less than 8% of OD have been removed, as well as one additional outlier (see outlier log).

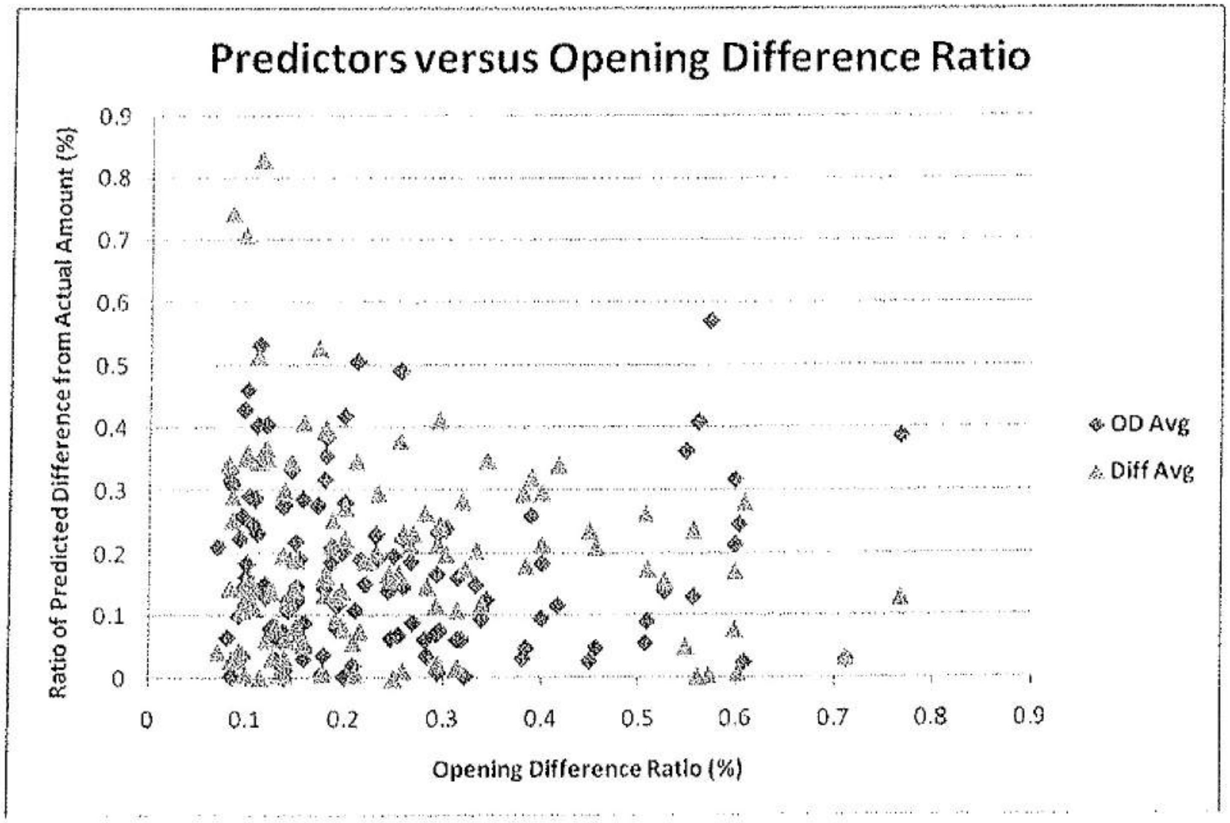
Predictors versus Opening Difference Ratio
Ratio of Predicted Difference from Actual Amount (%)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Opening Difference Ratio (%)
OD Avg
Diff Avg

FIGURE 9

TESTS WITH NEW DATA

In the analysis of the adjusted data, I followed the exact same procedures I used to develop the models in the original data. I will hence not explain the rationale behind the decisions made, and instead just present the results.

FIGURE 10.

The R^2 values of the lines of best fit for OO and OD versus SS are significantly higher in this data set than in the previous. This suggests that the predictive models generated from this data will provide much more accurate predictions.

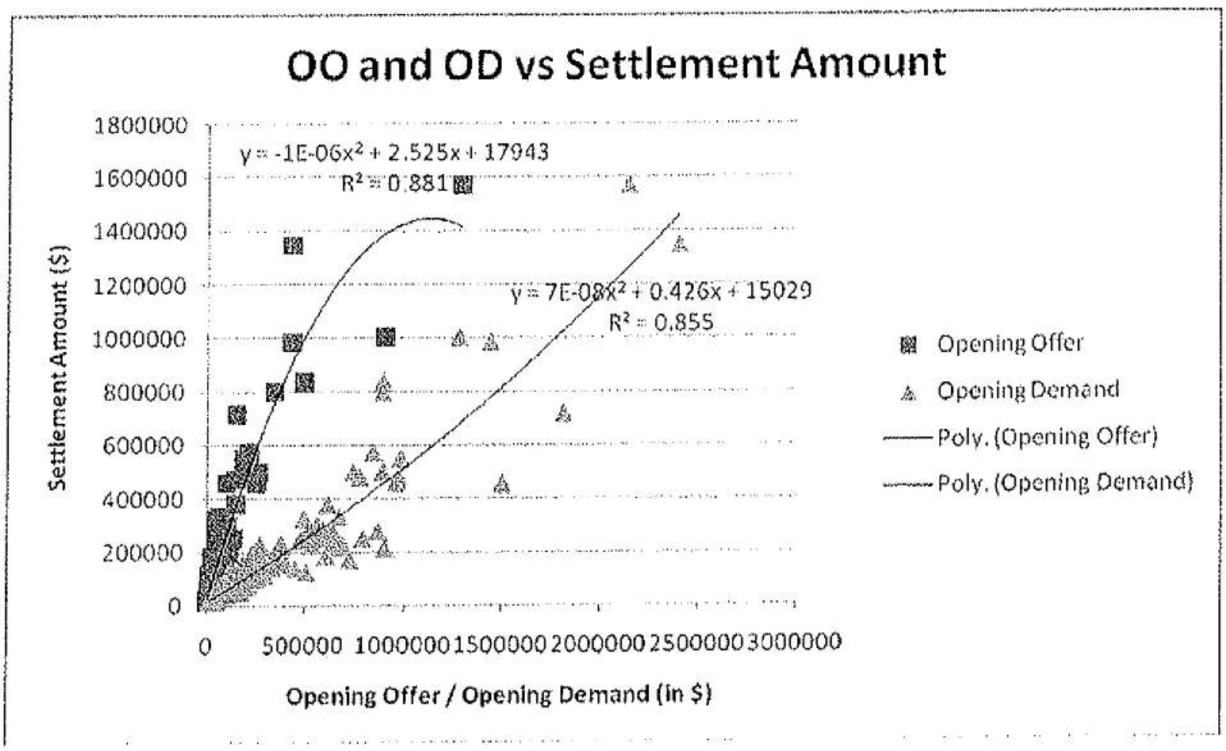

FIGURE 10

FIGURE 11.

This figure demonstrates the value of averaging the fitted values of OO and OD. The lines of best fit for OO and OD are averaged here to give a very linear trend with a very high R^2 value of 0.939; significantly higher than the respective values of OO and OD: 0.8818 and 0.8552.

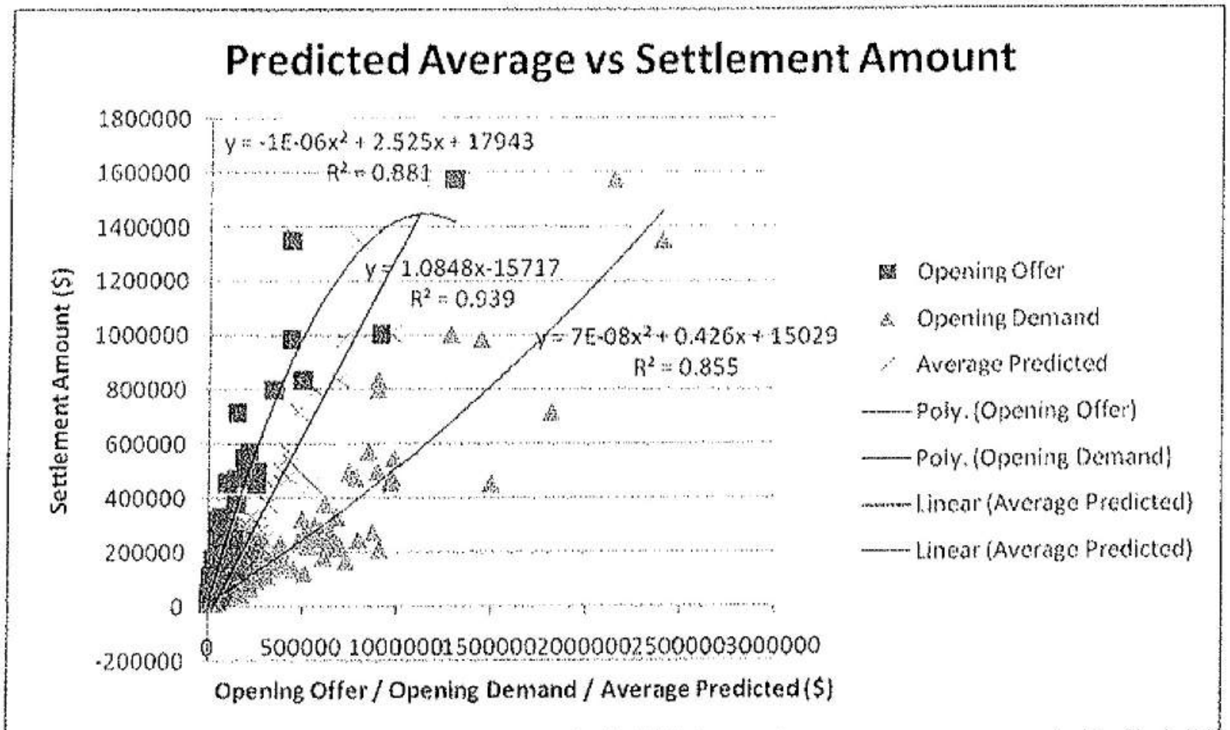

FIGURE 11

FIGURE 12.

The correlation between the initial difference of OO and OD, and the final settlement value's difference from OD and OO respectively. Using the difference between OD and SS proved to be significantly stronger than using the difference of OO and SS. Both polynomial and linear trendlines were tested; though the polynomial line had a better fit, its difference wasn't significant enough to warrant the added complexity of using polynomial equations. The resultant equation is $y = 0.6471x + 1172.3$.

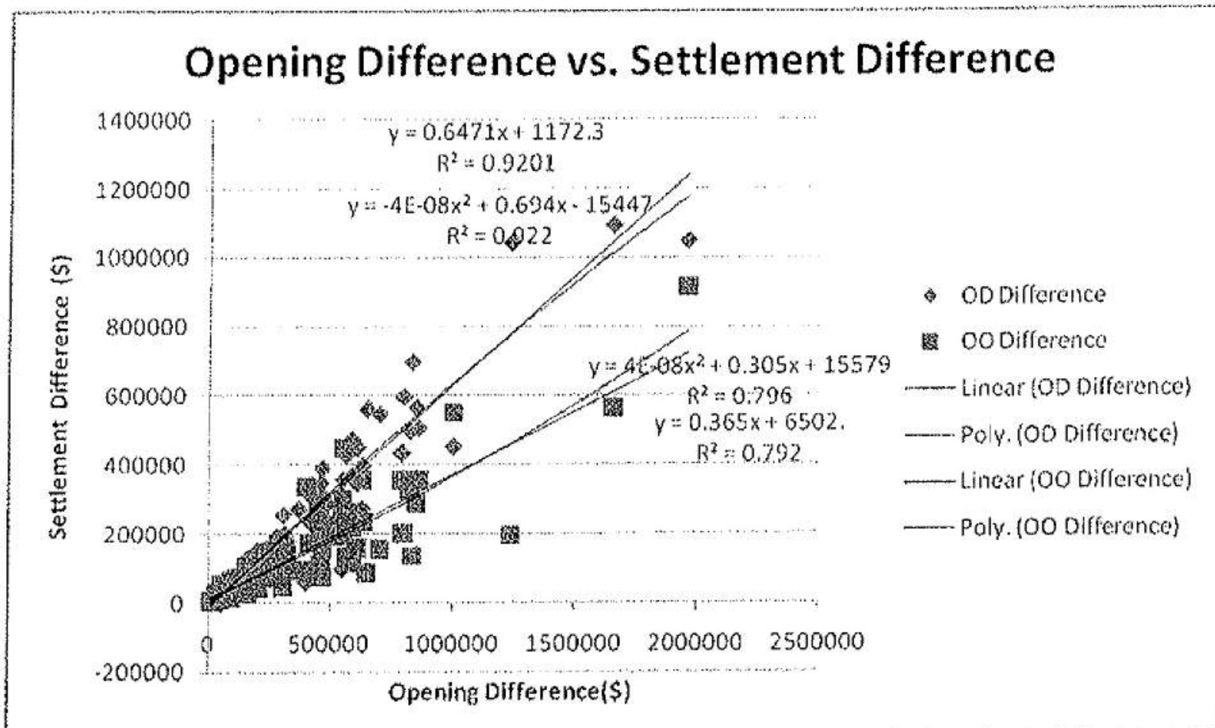

FIGURE 12

FIGURE 13.

In this analysis of each predictor, we get slightly different results than we did with the previous data set. The OD difference heuristic gave an R^2 of 0.9449, a significant improvement over 0.9096 in the last dataset. The OO-OD average heuristic gave an R^2 of 0.9394, a minimal improvement over the 0.9304 from the previous dataset. Finally, the combination heuristic gave the highest R^2 value, with 0.9511, a dramatic improvement over the 0.9203 from the last dataset.

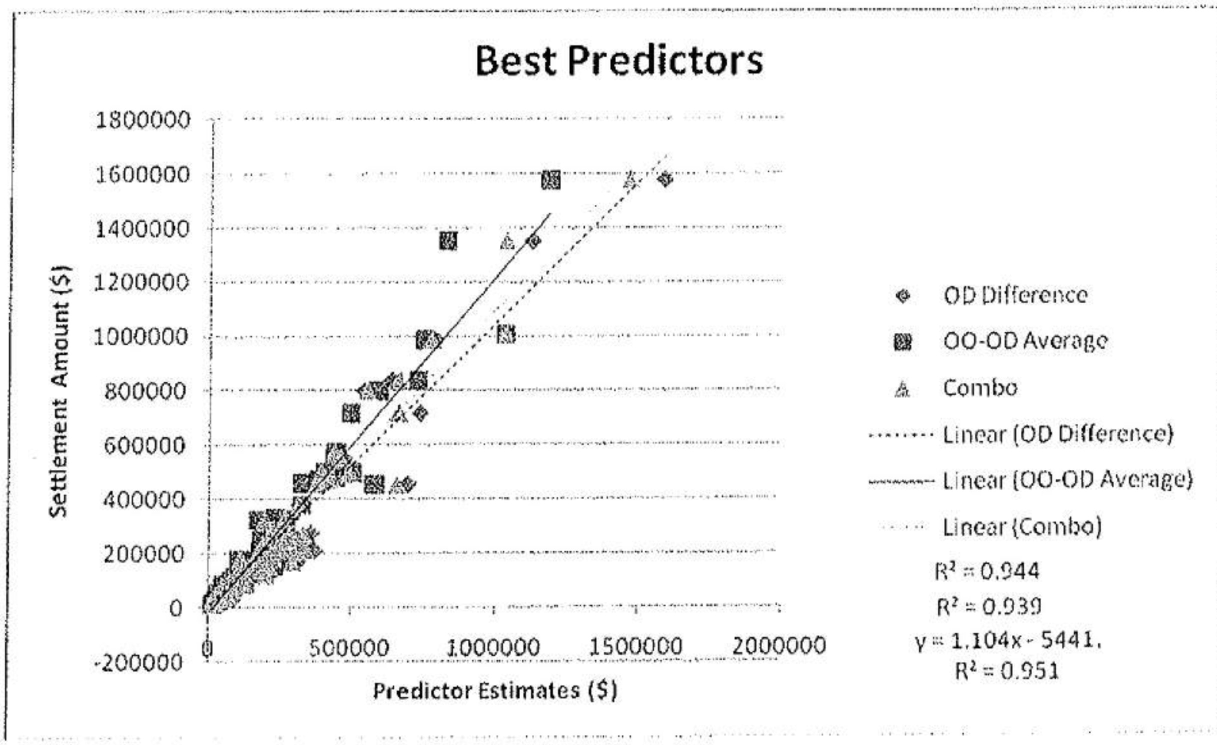

FIGURE 13

RESULTS

SUMMARY

In the original data set, the most effective predictor of the final settlement value was the heuristic developed through averaging the Opening Offer and Opening Demand lines of best fit, and then taking the line of best fit from those new values *(eq. 1)*. The effectiveness of this equation is summarized in Table 1 and 2.

In the trimmed data set, wherein all records with an Opening Offer value less than 8% of the Opening Demand were removed, the best predictor was a combination of the most effective heuristic from the original data set, mixed with the heuristic that used the difference between Opening Demand and Opening Difference, as a predictor for the difference between Settlement and Opening Demand, and used that value to calculate the predicted final settlement. The combination heuristic *(eq. 5)* gives different weights to both of the heuristics that make up the combination heuristic. I found the best results with approximately 30% weight given to OD-OO average *(eq. 3)*, and 70% weight given to OD Difference *(eq. 4)*. Tables 3 and 4 summarize the effectiveness of the combination heuristic on the final data set.

Equation 1.
OO-OD average from original data set.

BestFitFromOO = -0.000001*OO^2 + 2.5162*OO + 33906

BestFitFromOD = 0.0000001*OD^2 +0.3382*OD +16066

AveragedPrediction = (BestFitFromOO+BestFitFromOD)/2

BestFitOfAveragePrediction = 1.1238*$AveragedPrediction$ - 22983

Summarized:

$$SS = 1.1238 * \frac{(-0.000001 * OO^2 + 2.5162 * OO + 33906) + (0.0000001 * OD^2 + 0.3382 * OD + 16066)}{2} - 22983$$

Equation 3.
OO-OD average.

BestFitFromOO = -0.000001*OO^2 + 2.5287*OO + 17917

BestFitFromOD = 7*-0.00000001*OD^2 +0.4249*OD +15576

AveragedPrediction = (BestFitFromOO+BestFitFromOD)/2

BestFitOfAveragePrediction = 1.0848*$AveragedPrediction$ - 15717

Summarized:

$$SS = 1.0848 * \frac{\left(-0.000001 * OO^2 + 2.5287 * OO + 17917\right) + \left(7 * -0.00000001 * OD^2 + 0.4249 * OD + 15576\right)}{2} - 15717$$

Equation 4.
Opening Difference.

OpeningDifference = OD-OO

BestFitFromOpeningDifference = 0.6471* OpeningDifference + 1172.3

SettlementPrediction = OD-BestFitFromOpeningDifference

Summarized:

$$SS = OD - (0.6471 * (OD - OO) - 1172.3)$$

Equation 5.
Combination.

$$SS = 0.3 * Equation3 + 0.7 * Equation4$$

TABLE 1. DIFFERENCE FROM ACTUAL VALUE ($) FOR EQ. 1

Minimum	137.46
Maximum	358769.17
Mean	37472.69
Standard Deviation	50147.29

TABLE 2. DIFFERENCE FROM ACTUAL VALUE (%) FOR EQ. 1

Minimum	0.002
Maximum	2.152
Mean	0.296
Standard Deviation	0.333

TABLE 3. DIFFERENCE FROM ACTUAL VALUE ($) FOR EQ. 5

Minimum	338.80
Maximum	357587.27
Mean	40971.74
Standard Deviation	57574.78

TABLE 4. DIFFERENCE FROM ACTUAL VALUE (%) FOR EQ. 5

Minimum	0.002
Maximum	1.765
Mean	0.272
Standard Deviation	0.314

Discussion

The results from this analysis can be used to inform your expectations for settlements. From the first few analyses made, we learned that there are numerical ratios that generally represent the relationship between the opening values and the final settlement. From the more detailed analysis, we derived equations that can provide a more detailed estimate of the final settlement. In general, you can use the initial ratios we discovered as guidelines. If you want a detailed prediction, you can then categorize the settlement into one of the following categories. Category A: if the opening offer is less than 8% of the opening demand; otherwise, it belongs to Category B. If it belongs to Category A, you can use Equation 1 to generate a prediction, and the expected accuracy of that prediction is outlined by Tables 1 and 2. It it belongs in Category B, use Equation 5, and its expected accuracy is outlined by Tables 3 and 4.

Of course, the original data set used for this analysis did not contain any unsettled cases. The unsettled cases could not be used to generate any relevant data. The primary issue with unsettled cases was the fact that there were no settled cases that had any Final Demand or Final Offers. If this data had been tracked throughout the mediation process, then there would have been room to analyze expectations based on these values.