IPO Closing Price Prediction Analysis:

A Lens Model Analysis

MANA 4349

Managerial Decision Making

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Executive Summary

The purpose of this study was to analyze whether or not common publicly available data could be used to reliably predict the performance of a company’s initial public offering (IPO) on its first day of trading. We also hoped to be able to analyze which data was most valid in making these predictions.

The data was analyzed using the Decision Analysis System, which is based on the lens model method. This offers nine indices for accurate data analysis, sum of absolute differences, judgment and outcome means, achievement index, linear outcome predictability, linear judgment predictability, knowledge, and cue validity and utilization coefficients.

Four judges were asked to predict the performance of forty of the most recent IPO’s using eight commonly used market cues. The specific single prediction they were asked to make was what the closing price after the first day of trading would be. The cues were made up of general corporate information and relevant financial statistics. The judges were not allowed access to any other cues to ensure the integrity of the results.

An initial analysis of the data collected showed that reasonably accurate predictions could be made using these publicly available cues. All the judges faired very well and their performance was predictable considering their respective market experience. The more experienced traders more accurately predicted the actual IPO closing prices, whilst the least experienced were less accurate. There were some small anomalies but these may be the result of a very small sample of judges.

The usefulness of the cues varied considerably, the most useful cues for predicting an IPO’s performance seemed to be offer price and whether or not a top tier underwriter was
offering the IPO. The least useful cues were generally the company’s financial statistics. The data showed that the less experienced judges tended to think that the financial data was relevant, whereas the more experienced judges discounted its usefulness.

After minor adjustments for luck the judgment results showed very clearly that experience is an important component in picking which IPO’s will perform well. The highest achievement index had to be somewhat discounted due to the lack of a high judgmental predictability value and an excessively high non-linear match value. Some ancillary research showed that after reviewing the results of previous IPO’s, a novice judge could subsequently make far more accurate judgments.
Introduction

An IPO is the Initial Public Offering of a company’s stock when it starts trading openly on a public stock exchange (see Appendix C for an IPO glossary). Every company that trades its stock went through an IPO at some point during its life. However, not all companies are publicly traded; even some major corporations are still privately held.

There are many reasons for a company to go public, primarily companies use the funds raised from selling a portion of their stock to raise operating capital. Other companies have plenty of capital but use publicly redeemable stock as a method of rewarding employees through stock options.

Whatever the reasons, IPO’s offer investors an unparalleled opportunity to generate returns that are difficult to surpass through any other legitimate trading method. In this study alone, some stocks increased in value almost 300% in their first day of trading with common gain well over 50%. This does not mean that IPO’s are by any means a sure thing, if a company’s stock is not desirable the value will drop.

This study is very timely for a number of important reasons, historically non-professional investors have had very limited access to IPO’s. Financial institutions have reserved access to the limited IPO process for their biggest customers as a reward for their business. But things are changing due to public demand and technology companies leading the proliferation of IPO, public accessibility to IPO’s is increasing rapidly. What has always been something the average investor could only speculate about is now a real opportunity for investment.
One important fact anybody interested in getting involved in the new-issue market should know is that IPO’s have historically underperformed the rest of the stock market. In 1997, for example, IPO’s gained about 14.3% from the offering price versus a 31% gain for the Standard & Poor's 500 Index. And if you use an IPO's first trade price as a benchmark, IPO’s in 1997 rose only 8.9% above their opening prices. Clearly, any potential investors need to go beyond the allure and hype of IPO’s and become educated about the facts.

The question this study tries to answer is whether or not IPO’s are a real opportunity to make lots of money or just a quick way to lose it all. Does the average non-professional investor realistically stand a chance of picking a successful IPO stock.
Description of Procedures

The basic format of the research for this study was a questionnaire. It listed 8 pieces of data for 40 unnamed companies that had recently gone public. Each judge was given as long as they felt necessary to predict what price they believed each respective companies stock would close at. The judges were instructed not to use any other sources of information except those which were provided.

The results where then entered into Excel spreadsheets for analysis and interpretation. Every effort has been made to interpret the data in an objective and methodical manner. The reader should be aware that as with any data the result of this study may be interpreted in many different ways.

It is also important to point out that the scope of this study is extremely limited and the inferences that can be made should not be necessarily accepted as valid without further research.

Description of Outcome

The outcome was the IPO’s closing price after the first day of trading.

Description of Judgment

The judgments were the judges’ estimates of each IPO’s closing price after the first day of trading.

Description of Cues

Investors collectively consider an immeasurable number of cues and apply dozens of different systems to evaluate them when picking stocks. It is beyond the scope of this study to evaluate more than eight of those cues, so some of the most commonly used cue were evaluated. The cues used are also ones that are very easily available to the casual
investor and also must be made available as part of the SEC filling procedures of a public company.

When choosing the cues that would be evaluated and the ones that would be discarded from the initial line-up, the experts featured in this study where consulted for their input. It was the intention, that as the possible choice of cues was limited, all the cues used be relevant to the study.

The cues that made it through our selection process are as follows with a brief description of the cue and its relevance:

**Top Tier Underwriter.** This cue describes whether or not a major financial institution is offering the IPO. Many IPO’s are offered by smaller institutions who may not have the resources to necessary to research and correctly value a stock. Top Tier Underwriters would be household names to even the causal investor.

**Primary Industry.** This cue describes the primary industry of the company that is being offered. Some industries are notoriously volatile generally and especially so when first offered. Most of our featured investors expressed cautions about “Tech Stocks” although these are the stocks that offer the greatest potential gain.

**Total Employees.** This cue describes the total number of employees that are employed by the company being offered. It is a good reflection of the operating size of a company and its access to human resources. It also allowed one of our judges to calculate earning per employee, which he used as a hybrid cue.

**Revenue.** This cue represents the company’s total revenue for the preceding year (1998). Some of the companies are so new they don’t even have a previous year revenue listing.
Gross Profit. This cue represents the company’s total pre-tax profit for the preceding year. As with revenue, this was not available for all companies. Although you may think this would be a good measure of a company’s worth it should be noted that Amazon.com has never turned a profit but is still one of the market most highly valued companies and was also a very successful IPO.

Assets. This cue represents the company’s total operating assets which included all material possessions of the company that have a positive value.

Liabilities. This cue represents the total value of everything the company owes. It is the debt that is currently maintained by the company. It is though to be relevant as many companies go public solely to pay-off high interest debtors.

Offer Price. This is the price that the underwriter is offering the stock for on the first day of trading. In other words it is the opening price, it is believed that most underwriters price the stock so that it will increase in price roughly 15% during the first day of trading. It is in relation to this cue that the first cue is important, an underwriter with limited resources and experience will have a hard time accurately setting the IPO Offer Price.

Description of Judges

The most interesting and possibly important part of this study was choosing the judges. In order to evaluate the relevance of the data it was important to choose judges with varying abilities so the results would be contrasted. Using this approach we can identify problems with the results very early on. If for example a novice investor seems to out-perform an expert investor we know immediately that the data needs to be scrutinized more closely.
The study included two expert investors, one casual investor and one completely novice investor. The casual investor is of most interest to us as we want to know how he will perform against the others. What we would expect is for him to out-perform the novice investor but under-perform the experts.

A description of each judge follows:

**Phil.** This judge is a CPA and the CFO of a midsized energy company and well versed with the inner-working of IPO’s, having presided over a number of them himself. He represent our most able expert for this study and was expected to perform the best on our survey.

**Kevin.** This judge is a CPA and among other things presides over a number of multi-national investments oriented companies. He is well versed with the IPO process and actively monitors market activity. He was expected to perform second best on our survey.

**Tom.** This judge is an IS Professional and represents the casual investor. He has a small portfolio and is familiar with the IPO process although has never had the opportunity to get involved in it. He was expected to do third best on our survey.

**Lonnie.** This judge represents our “monkey with a dart” (no offense intended to our judge or to the primate population at large). His first question when looking at the survey was “what’s revenue?” His results would present us with our baseline values when evaluating the performance of the rest of our judges.
Results

In interpreting the results of this study, it is important to note, as shown in Appendix A, that multicollinearity exists among some of the cues. That is, the correlation between some of the cues has an absolute value greater than 0.50. With the given data, it is expected that the cues will be quite closely correlated. It is hardly surprising that a company with huge assets probably has huge liabilities also. The implication of this is that cues may be contributing repetitive information that is likely to make it more difficult to interpret cue validity and cue utilization coefficients.

The knowledge linear match index assesses the linear match between cues usage and how the cues relate to the outcome. A judge’s usage of individual cues is also important to review. This can be done by comparing cue utilization coefficients (the correlation between a cue and a judgment) with the relevant cue validity coefficient (the correlation between the actual outcome and the cue).

Prior to making suggestions in reference to how a judge might improve his ability to predict the closing price of the different IPO’s using the cues made available in this study, we must first determine whether these cues are, in fact useful in predicting the closing price of a particular IPO. Higher indexes indicate that the cues, as a group, are useful for predicting the measured outcome. In this study, linear outcome predictability, which measures the multiple correlation between outcome and cues, was 0.84. This number is pretty close to 1 indicating that the cues as a group are very useful predictors of the future closing price in this study.
It is also important to determine whether each judge was consistent in his use of his decision-making strategy. To do this we evaluate their linear judgmental predictability score, a value closer 1 represents a more consistent decision making process.

In looking at the cue validity coefficients, and ignoring the possibility of multicollinearity, offer price (0.73) and top tier underwriter (0.28) were the most valuable cues in predicting the future closing price of IPO’s. Primary industry (-0.18) was a moderately useful cue and assets (0.08) and liabilities (0.08) were less than moderately useful cues. However, revenue (-0.06), gross profit (-0.04), and total employees (0.02) were the least valuable cues in this study.

In the following sections, each judge’s results will be analyzed using the lens model. Our analysis for each judge will include the various lens model factors that are shown in Appendix B.

Phil’s Results

A summary of Phil’s results is shown in Appendix B. As can be seen from a review of Appendix B, Phil’s overall results, as measured by the sum of absolute difference (214.08), were the best when compared with the results of the other judges in this study. That is, the sum total of misses predicted by Phil was the lowest. Phil’s judgment mean (12.73) was lower than the outcome mean (16.68), indicating that he predicted too low and his judgments should be increased on average. Phil’s judgment standard deviation (4.68) was far less than the actual outcome standard deviation (14.56).

Phil’s overall results can be interpreted further by reviewing his achievement index (0.687) and its components: linear match component (0.688) and nonlinear match component (0.000). Phil’s linear match component (0.688) is not close to the linear
outcome predictability (0.84), which indicates that he is not making optimal use of the available cues. Phil’s linear judgmental predictability, which measures the relationship between the judge’s judgments and the cues, was 0.96 indicating that he was very consistent in making his judgments. Phil’s knowledge linear match was 0.84, which is higher than the other judge’s index indicating that his cue usage was overall accurate.

A comparison of Phil’s cue utilization coefficients with the comparable cue validity coefficients shows that he relied most heavily on the two cues with the highest validity, offer price (0.95) and top tier underwriter (0.58). Whilst making less use of assets (0.52) and liabilities (0.52) and even less use of the remaining four cues.

Kevin’s Results

A summary of Kevin’s results can be seen in Appendix B. Kevin’s overall accuracy, as measured by both the sum of absolute differences (215.90) and his overall achievement index (0.714), was less accurate than Phil’s. Kevin’s judgment mean (11.75) was much lower than the actual outcome mean (16.68), indicating that he generally tended to underestimate the closing price of the IPO’s. In addition, his judgment standard deviation (4.50) was much lower than the actual outcome standard deviation (14.56).

Breaking Kevin’s achievement index (0.714) into its components, the linear match component was 0.684 and the nonlinear match component was 0.030. Comparing the linear match component with the linear outcome predictability coefficient (0.84) indicates that Kevin did not make optimal use of the available cues.

Kevin was consistent in his usage of his decision strategy as is shown by his high linear judgmental predictability (0.98). In addition, shown by his knowledge linear
match (0.82), overall he used the available cues in a manner that related to the outcome. His individual cue utilization coefficients also reflect a decision strategy that matched the cue validity of the various individual cues. For example, offer price (0.73) was the most valuable cue in this study and Kevin relied very heavily on the offer price as his most significant cue with a usage of 0.98.

Tom’s Results

In reviewing Tom’s overall accuracy of results it is important to note that the sum of the absolute differences between the outcome and his judgments (239.94) was the highest of the four judges which indicates that he missed a lot relative to the other three judges. Tom’s judgment mean (12.65) was lower than the actual outcome mean (16.68), which indicates that he predicted a lower closing price on the IPO’s. Tom’s judgment standard deviation (5.54) was far lower than the actual outcome standard deviation (14.56).

Tom’s overall results can also be seen by looking at his achievement index (0.732) which is the highest when compared with the results of the other judges in this study. Breaking the achievement index into its components, the linear match component of Tom’s achievement index was 0.597 and the nonlinear match component was 0.134. Tom’s knowledge linear match component (0.82) is very close to the linear outcome predictability (0.84) that indicates that he is making optimal use of the available cues.

Lonnie’s Results

Lonnie’s overall accuracy was lower than the other three judges that were in this study. Lonnie’s sum of absolute differences between the outcome and his judgments was 237.82 which is 2.12 less than the highest sum of absolute differences (239.94). That is, Lonnie missed many decisions in deciding the closing price of IPO’s. Lonnie’s judgment
mean (12.34) was lower than the actual outcome mean (16.68). His judgment standard deviation (5.84) was lower than the actual outcome standard deviation (14.56) indicating that he should increase his spread relative to the mean.

Breaking Lonnie’s achievement index (0.600) into its components, the linear match component was 0.577 and the nonlinear match component was 0.023. Comparing the linear match component with the linear outcome predictability (0.84) indicates that Lonnie did not make optimal use of his cues available to him in this study.

Lonnie’s linear judgment predictability index indicates a consistent methodical approach. Lonnie can improve future performance by relying less on assets (0.58) and liabilities (0.52) and relying more on primary industry (-0.02) and ignoring total employees (0.20).
Conclusion

The purpose of this study was to determine whether or not IPO’s present a viable opportunity to the casual investor. Beyond the hype and the speculation, can the average moderately informed investor make a reasonable decision on whether or not an IPO will be successful and therefore make a return on their investment.

In short the answer is yes, or maybe no. To be honest it is hard to be sure, the lens model statistics show us a strong correlation between our judges predictions and the outcome but is does not account for many other variable that would be necessary in order to know for sure. We would need a solid measure of confidence level on each judgment, for example how much of a given total amount of money would each judge be willing to place on a given IPO. We would need to determine how high the judge’s Achievement Index needs to be in order to come out ahead on average.

Analysis of the Cues

What we can see is that the results suggest that the cues used can predict with a given amount of certainty how an IPO will perform. This we see by the relatively high linear outcome predictability of 0.84, 1.00 would represent a sure thing. If a judge used every cue optimally he would be able to predict an IPO closing price with an 84% chance of being correct. This may sound good but when we look more closely at the cues we see some definite limitations.

The cue validity coefficients show us that only two of the cues where of any real use, whether there was a top tier underwriter and the offer price. All the other cues had an absolute value of less that 0.1, except primary industry, which was only -0.18. This has a problematic implication, it tells us that we can invest in an IPO’s if it is offered by a top
tier underwriter and we should pay close to the offer price. Obviously this is not actually the case in the IPO market. So what does this mean? It probably means that our two valid cues are indicators (correlated to) for the existence of other more complex cues. For example, offer price is probably determined by reviewing many quantifiable and un-quantifiable factors. These include the perceived market value of a company, which can be very difficult to estimate. A top tier underwriter has the resources to do a lot more research than a small underwriter, and it is difficult to quantify the effects of the increased market confidence in the bigger institution. But size does not guarantee that the necessary due diligence will take place before the IPO.

It is clear from looking at the data that although it appears to be relatively valid, we would need more data before taking on this difficult task in the real world. It is also clear that common sense may not have much of a bearing on the prediction process, who would think that assets and liabilities have practically no bearing on the IPO closing price of a company.

It is worrying that all our judges grossly underestimated the actual spread of the results, we see and average judgment standard deviation that is three time less that the outcome standard deviation. Comparatively, our judge’s judgment means faired a lot better, falling within an acceptable range of the outcome’s mean.

Analysis of Overall Judges’ Performances

Our best performing judge managed an achievement index of 0.73 from data that had linear outcome predictability of 0.84. This was despite a fair amount of useless data that complicated the matter. It is clear all the judges relied far too heavily on the financial data but their usage of the valid cues was very good. The judgment means where all lower
than the outcome means and they where also surprisingly close to each other, the highest and lowest means only deviated $1.07 which represents less than 10% of the highest value. One might expect a larger difference considering the varying level of IPO experience amongst our judges.

This fact suggests a fairly similar decision making strategy from all the judges, which is also reflected by similar cue utilization figures. This similar strategy is also reflected in very close standard deviation figures, which where quite a long way off the outcome’s standard deviation. This may simply suggests that our judges were not aware of quite how volatile the present IPO market is.

Analysis of Individual Judge Performances

**Phil.** Our IPO expert ended up with the second lowest achievement index although his achievement index had the highest linear match component. His non-linear match component of 0.0 suggest he was using the cues provided and nothing else, this suggest there is not even a element of guessing involved in Phil’s decision making process.

Combined with a high judgmental predictability value we can conclude that Phil’s decision making process is the most consistent of all. If further data showed his AI of 0.687 is high enough to generate a return on the investment we could conclude that Phil would be a very safe bet for IPO picking in the future.

**Kevin.** Our market expert had the second highest achievement index and had the highest judgmental predictably rating. He generally used the most valid cues more than anyone else but also used the least valid cues extensively. His accounting background is evident in his heavy use of the financial data. What Kevin perhaps forgot is that IPO performance is not a direct measure of the book value of a company.
**Tom.** Our casual investor ended up with the highest overall achievement index, although a closer look at Tom’s data suggest luck may have played a substantial part in his overall performance. His comparatively low judgmental predictability and his high non-linear match make it unclear exactly how he achieved the most accurate predictions. His cue usage when compared to the other judges would suggest he should have a poorer overall judgment performance.

Tom insisted that his higher achievement index was based on a better understanding of the inner working of a corporation than the other judges. He said that although Phil and Kevin have more market experience they spend more time looking at the assembly of IPO’s and he spends more time looking at how a company works. It was pointed out to Tom that the data suggested his success was due to guessing but he discounted this as a limitation of the analysis program.

**Lonnie.** Our novice investor did remarkably well considering the competition he was up against and his lack of experience with the stock market. He turned out the best standard deviation but had the lowest achievement index. His judgmental predictability showed a consistent decision-making process and he steered away from the less valid cues pretty well. He did use assets and liabilities more than he should have, but so did all the other judges. His cue utilization patterns are surprisingly similar to Tom’s, which throws additional doubt on the validity of Tom’s claims.

Potential Problems with this Study and It’s Results

There are a number of factors that need to be considered when assessing the overall usefulness of this study for telling us whether or not we should jump onto the IPO band
wagon. Following are some of the factor that need to be considered by the reader when evaluating our result and conclusions.

**Nature of the Topic.** Whilst researching this project it became clear that the performance of an IPO is not closely related to the actual performance potential of a company but is in fact related to market desirability. Desirability is unfortunately controlled by a number of factors that cannot be quantified easily. One of these factors is hype. The fact that top tier underwriters are generally more successful than smaller ones may have a lot to do with their ability to generate more hype.

**Limitation of Cues Used.** One of the original problems with this project was the large number of cues that professional investor use when evaluating an IPO’s potential. The initial list of commonly used cues was over forty, these were reduced to a very-short list of ten. This in turn needed to be reduces to the final number of eight. This is also perhaps the reason that all the judges ended up having such comparatively close predictions.

All the judges except our novice investor complained at the lack of information available. Phil mentioned that it would be nothing more than a stab in the dark without each IPO’s prospectus. IPO prospectuses generally have performance and IPO related information running back five years and offer a very in depth study of a company’s business model.

**Sample Limitations.** The study’s sample was extremely limited, although the questionnaire did collect a fair amount of data (forty individual predictions), only four judges returned their questionnaires. Although the judges we were most interested in
evaluating did respond, the study was limited by the fact we could not evaluate a more extensive sample of investors.

**General Usefulness of Study.** This study does demonstrate that publicly available information can be used to help accurately predict the closing price of an IPO. It’s limitation, is that the cues it tells us are valid, can clearly not be the sole indicators of an IPO pending performance. It is however an encouraging result and certainly indicates that further research of this sort will be useful to would-be investors.
Appendix A – Cue Analysis

Cue Means and Standard Deviations

<table>
<thead>
<tr>
<th>Cue Name</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Tier Underwriter</td>
<td>0.53</td>
<td>0.51</td>
</tr>
<tr>
<td>Primary Industry</td>
<td>1.95</td>
<td>1.83</td>
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<tr>
<td>Total Employees</td>
<td>515.78</td>
<td>1250.29</td>
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<tr>
<td>Revenue ( Millions)</td>
<td>98.97</td>
<td>227.29</td>
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<tr>
<td>Gross Profit</td>
<td>10.18</td>
<td>37.37</td>
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<td>Assets ( Millions)</td>
<td>249.05</td>
<td>846.3</td>
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<tr>
<td>Liabilities</td>
<td>172.44</td>
<td>581.93</td>
</tr>
<tr>
<td>Offer Price</td>
<td>11.71</td>
<td>4.21</td>
</tr>
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</table>

As seen below, with the given data it is expected that the cues will be closely correlated.

Cue Intercorrelations

<table>
<thead>
<tr>
<th></th>
<th>Top Tier Underwriter</th>
<th>Primary Industry</th>
<th>Total Employees</th>
<th>Revenue</th>
<th>Gross Profit</th>
<th>Assets</th>
<th>Liabilities</th>
<th>Offer Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Tier Underwriter</td>
<td>1.00</td>
<td>-0.05</td>
<td>0.25</td>
<td>0.32</td>
<td>0.15</td>
<td>0.24</td>
<td>0.23</td>
<td>0.47</td>
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<tr>
<td>Primary Industry</td>
<td>-0.05</td>
<td>1.00</td>
<td>0.45</td>
<td>0.35</td>
<td>0.43</td>
<td>0.14</td>
<td>0.16</td>
<td>-0.06</td>
</tr>
<tr>
<td>Total Employees</td>
<td>0.25</td>
<td>0.45</td>
<td>1.00</td>
<td>0.74</td>
<td>0.76</td>
<td>0.52</td>
<td>0.60</td>
<td>0.33</td>
</tr>
<tr>
<td>Revenue</td>
<td>0.32</td>
<td>0.35</td>
<td>0.74</td>
<td>1.00</td>
<td>0.63</td>
<td>0.52</td>
<td>0.53</td>
<td>0.22</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>0.15</td>
<td>0.43</td>
<td>0.76</td>
<td>0.63</td>
<td>1.00</td>
<td>0.03</td>
<td>0.07</td>
<td>0.03</td>
</tr>
<tr>
<td>Assets</td>
<td>0.24</td>
<td>0.14</td>
<td>0.52</td>
<td>0.52</td>
<td>0.03</td>
<td>1.00</td>
<td>0.98</td>
<td>0.56</td>
</tr>
<tr>
<td>Liabilities</td>
<td>0.23</td>
<td>0.16</td>
<td>0.60</td>
<td>0.53</td>
<td>0.07</td>
<td>0.98</td>
<td>1.00</td>
<td>0.56</td>
</tr>
<tr>
<td>Offer Price</td>
<td>0.47</td>
<td>-0.06</td>
<td>0.33</td>
<td>0.22</td>
<td>0.03</td>
<td>0.56</td>
<td>0.56</td>
<td>1.00</td>
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Appendix B – Judge’s Results

Phil’s Judgment Analysis

Sum of Absolute Differences = 214.08

Outcome Mean = 16.68  Judgment Mean = 12.73
Outcome Std. Deviation = 14.56  Judgment Std. Deviation = 4.68

Achievement Index = 0.687
Achievement Index (linear match) = 0.688
Achievement Index (nonlinear match) = 0.000

Linear Outcome Predictability = 0.84
Linear Judgmental Predictability = 0.96
Knowledge:  Linear Match = 0.84
Nonlinear Match = 0.00

<table>
<thead>
<tr>
<th>Cues</th>
<th>Cue Validity</th>
<th>Cue Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Tier</td>
<td>0.28</td>
<td>0.58</td>
</tr>
<tr>
<td>Underwriter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Industry</td>
<td>-0.18</td>
<td>-0.08</td>
</tr>
<tr>
<td>Total Employees</td>
<td>0.02</td>
<td>0.33</td>
</tr>
<tr>
<td>Revenue (Millions)</td>
<td>-0.06</td>
<td>0.23</td>
</tr>
<tr>
<td>Gross Profit (Millions)</td>
<td>-0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>Assets (Millions)</td>
<td>0.08</td>
<td>0.52</td>
</tr>
<tr>
<td>Liabilities</td>
<td>0.08</td>
<td>0.52</td>
</tr>
<tr>
<td>Offer Price</td>
<td>0.73</td>
<td>0.95</td>
</tr>
</tbody>
</table>
Tom’s Judgment Analysis

Sum of Absolute Differences = 239.94

Outcome Mean = 16.68  Judgment Mean = 12.65
Outcome Std. Deviation = 14.56  Judgment Std. Deviation = 5.54

Achievement Index = 0.732
Achievement Index (linear match) = 0.597
Achievement Index (nonlinear match) = 0.732

Linear Outcome Predictability = 0.84
Linear Judgmental Predictability = 0.86
Knowledge:  Linear Match = 0.82
            Nonlinear Match = 0.49

<table>
<thead>
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Kevin’s Judgment Analysis

Sum of Absolute Differences = 215.90

Outcome Mean = 16.68  Judgment Mean = 11.75  
Outcome Std. Deviation = 14.56  Judgment Std. Deviation = 4.50

Achievement Index = 0.714
Achievement Index (linear match) = 0.684
Achievement Index (nonlinear match) = 0.030

Linear Outcome Predictability = 0.84
Linear Judgmental Predictability = 0.98
Knowledge:  Linear Match = 0.82
            Nonlinear Match = 0.32

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Lonnie’s Judgment Analysis

Sum of Absolute Differences = 237.82

Outcome Mean = 16.68    Judgment Mean = 12.34
Outcome Std. Deviation = 14.56   Judgment Std. Deviation = 5.84

Achievement Index = 0.600
Achievement Index (linear match) = 0.577
Achievement Index (nonlinear match) = 0.023

Linear Outcome Predictability = 0.84
Linear Judgmental Predictability = 0.92
Knowledge:  Linear Match = 0.75
Nonlinear Match = 0.11

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Appendix C - Glossary of Terms

American depositary receipts (ADRs) -- offered by non-US companies wishing to list on a US exchange. They are called receipts because they represent a certain number of a company's regular shares.

Aftermarket performance -- used to describe how the stock of a newly public company has performed with the offering price as the typical benchmark.

All or none -- an offering that can be canceled by the lead underwriter if it is not completely subscribed. Most best effort deals are all or none.

Best effort -- a deal in which underwriters only agree to do their best to sell shares to the public. As opposed to the much more common deal, or firm commitment.

Book -- a list of all buy and sell orders put together by the lead underwriter.

Bought deal -- an offering in which the lead underwriter buys all the shares from a company and becomes financially responsible for selling them. Also called firm commitment.

Completion -- an IPO is not a done deal until it has been completed and all trades have been declared official. Usually happens about five days after a stock starts trading. Until completion, an IPO can be canceled with all money returned to investors.

Direct public offering (DPO) -- an offering in which a company sells its shares directly to the public without the help of underwriters. Can be done over the Internet. Liquidity, or the ability to sell shares, in a DPO is usually extremely limited.

Flipping -- when an investor buys an IPO at the offering price and then sells the stock soon after it starts trading on the open market. Greatly discouraged by underwriters, especially if done by individual investors.

Greenshoe -- part of the underwriting agreement that allows the underwriters to buy more shares -- typically 15 percent -- of an IPO. Usually done if a deal is extremely popular or was overbooked by the underwriters. Also called the overallocation option.

Gross spread -- the difference between an IPO's offering price and the price the syndicate pays for the shares. About 50% to 60% of the gross spread goes to the broker who sells the shares. Also called the underwriting discount.

Indications of interest -- gathered by a lead underwriter from its investor clients before an IPO is priced to gauge demand for the deal. Used to determine offering price.
Initial public offering (IPO) -- the first time a company sells stock to the public. An IPO is a type of primary offering that occurs whenever a company sells new stock. It differs from a secondary offering, which is the public sale of previously issued securities. Some people say IPO stands for "Immediate Profit Opportunities." More cynical observers say it stands for "It's Probably Overpriced."

Lead underwriter -- the investment bank in charge of setting the offering price of an IPO and allocating shares to other members of the syndicate. Also called lead manager.

Lock-up period -- the time period after an IPO when insiders at the newly public company are restricted by the lead underwriter from selling their shares. Usually lasts 180 days.

New issue -- same as an IPO.

Offering price -- the price investors allocated shares in an IPO must pay. Not the same as the opening price, which is the first trade price of a new stock.

Opening price -- the price at which a new stock starts trading. Also called the first trade price. Underwriters hope that the opening price is above the offering price, giving investors in the IPO a premium.

Oversubscribed -- defines a deal in which investors apply for more shares than are available. Usually a sign that an IPO is a hot deal and will open at a substantial premium.

Penalty bid -- a fee charged to brokers by the lead underwriter for having to take back shares already sold. Meant to discourage flipping.

Pipeline -- a term used to describe the companies that have filed an S-1 registration statement but haven't yet started trading.

Premium -- the difference between the offering price and opening price. Also called an IPO's pop.

Prospectus -- the document, included in a company's S-1 registration statement, which explains all aspects of a company's business, including financial results, growth strategy and risk factors. The preliminary prospectus is also called a Red Herring.

Quiet period -- the time period in which companies are forbidden by the Securities & Exchange Commission to say anything not included in their prospectus that could be interpreted as hyping an offering. Starts the day a company files an S-1 registration statement and lasts until 25 days after a stock starts trading. Intent and effect of quiet period have been hotly debated.
Roadshow -- a tour taken by a company preparing for an IPO in order to attract interest in the deal. Attended by institutional investors, analysts, and money managers by invitation only. Members of the media are forbidden.

Selling stockholders -- investors in a company who sell part or all of their stake as part of that company's IPO. Usually considered a bad sign if a large portion of shares offered in an IPO comes from selling stockholders.

S-1 -- document filed with the Securities & Exchange Commission announcing a company's intent to go public. Includes the prospectus and is also called the registration statement.

Spinning -- the practice of investment banks of distributing shares to certain clients, such as venture capitalists and executives, in hopes of getting their business in the future. Outlawed at many banks.

Syndicate -- a group of investment banks that buy shares in an IPO to sell to the public. Headed by the lead manager and disbanded as soon as the IPO is completed.

Venture capital -- the pre-IPO process of raising money for companies. Done only by accredited investors.