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About AdGooroo

Based in Chicago, AdGooroo provides competitive intelligence to search engine marketers through its suite of products, including AdGooroo Express, SEM Insight, and Trademark Insight. Over 1,000 companies rely on these keyword tracking tools and other unique products to provide them with quantifiable insights they can use to rise above the competition and build a long-term competitive advantage in search engine marketing.

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Research Brief: How keyword length and ad position impact clickthrough rate and cost-per-click on Google AdWords

June 23, 2008 - Of the many factors impacting campaign return, **cost-per-click (CPC)** and **clickthrough rate (CTR)** are among the most important. For this reason, it is vital that professional search marketers understand their relationship at more than a superficial level.

While it is common knowledge that CTR increases with CPC, little prior research has been conducted to explore the exact nature of this relationship. In a study conducted in early 2008, the AdGooroo research team attempted to quantitatively measure the correlation between CPC, CTR, and **average position** (as reported by Google AdWords). We also attempted to explore how the relationship changed with the specificity of the search term.

The end result of this study was a proprietary index (the “AdGooroo search index”) which illustrates how these relationships change across the entire range of ad positions on Google.

With this index, we were able to explore a variety of bidding scenarios and determined that in general, **bidding for the highest positions on the search results pages makes sense only for high-budget advertisers** seeking to maximize brand awareness.

On the other hand, **companies with a direct marketing focus (e.g. most advertisers) will typically maximize their profits by bidding for the second-to-last position on broad keywords and positions five to seven for niche keywords.** This bidding strategy minimizes costs while exploiting underpriced traffic opportunities at the bottom of the search results pages.

There are clearly exceptions to these rules. However, the index allows us to identify those situations in which we can likely bid aggressively for the top positions and thus improve our returns even further.

Finally, the index can also be used to reliably predict how a keyword ad will perform when historical data is unavailable or insufficient, such as when setting up a new campaign or managing keywords which receive only a few clicks per month.

Our Approach

We began by creating an initial dataset of CPC, CTR, and average position data for approximately 700 keywords ranging in length from one to three words each. These keywords were chosen at random from a variety of industries, products, and service offerings. The time period for collection was December 1 – 31, 2007.

For the purposes of our study, we were interested in analyzing only those search phrases with a sufficient quantity of data that would ensure statistical validity. The data for each keyword was retained only if it met two conditions:

1. There were at least 200 clicks during the time period of our study
2. The average position varied by at least one

333 of the search phrases in our initial dataset satisfied these conditions and were carried forward into the index calculation. For each of these phrases, we recorded the average CPC and CTR for both the starting and ending whole-number position:

Search Phrase	AvgPos _L	AvgPos _H	CTR _L	CTR _H	CPC _L	CPC _H
Keyword analysis	5.0	3.0	.38%	.68%	\$0.74	\$1.52

Using these two points, we calculated the slope of each relationship:

$$CPC_S = (CPC_H - CPC_L) / (AvgPos_H - AvgPos_L)$$

$$CTR_S = (CTR_H - CTR_L) / (AvgPos_H - AvgPos_L)$$

In the above example, the slope of the CPC between positions 5.0 and 3.0 for the phrase “keyword analysis” would be calculated as:

$$CPC_S = (\$1.52 - \$0.74) / (3.0 - 5.0)$$

$$CPC_S = \$0.39 / \text{position}$$

This figure represents a linear estimate of the change in CPC across different ad positions. A similar estimate for the CTR was also calculated for each keyword.

Both CPC_S and CTR_S are expressed in absolute values (e.g. dollars/position or percentage/position), so they must be normalized before a general index can be calculated. This was done by utilizing the slope data to create a step function illustrating the percentage change in either CPC or CTR across one ad position.

As an illustration of this, consider the above search phrase, “keyword analysis”. At position 5.0, the CPC is \$0.74. By adding the slope variable, CPC_S , we can estimate the CPC one position higher (4.0) to be \$1.13 (= \$0.74 + \$0.39). The percentage change in CPC between the two positions is 52.7% (= \$1.13 / \$0.74).

We repeat the above process to calculate the percentage change between position 4.0 and 3.0. We end up with two data points from our original dataset:

Search Phrase	AvgPos _L	AvgPos _L	CPC _Δ
Keyword analysis	5.0	4.0	52.7%
Keyword analysis	4.0	3.0	34.5%

Using the same process, we can calculate the entire set $\{CPC_{\Delta}\}$ for all search phrases in our dataset. We compute $\{CTR_{\Delta}\}$ in a similar fashion.

The mean and standard deviation for $\{CPC_{\Delta}\}$ for each integer position are then calculated to create a standardized index showing the estimated percentage change in CPC for each position on Google AdWords. Given sufficient data, this index $\{CPC_{\Delta}\}$ can be computed separately for search phrases of different lengths to explore how the CPC changes according to the specificity of the visitors' queries.

The Linear Relationship Assumption

It should be noted that we've used a simple linear regression technique to estimate the relationship between our study variable (CPC or CTR) and the average position, but we do not rely on the assumption that this relationship is linear. In fact, we have found that this relationship tends to be exponential for the vast majority of search phrases, as illustrated in the following chart:



Across the entire range of ad positions, the relationship between CPC and average position is clearly nonlinear (as illustrated by the black lines). However, across just a few positions, the relationship can be closely estimated by a linear estimate. The vast majority of data points in our dataset varied by less than two positions, thus the expected error due to nonlinearity in our index should be quite low.

Other Limitations

Our study did not take into account the effect of ad copy optimization, which can have a significant impact on the clickthrough rate of a particular search ad. However, we believe that the impact of this bias should be minimized due to the effect of averaging our measurements out across hundreds of keywords.

We were also unable to compute the search index for phrases consisting of four or more words due to lack of sufficient clickthrough data for these terms. However, we believe that the results gleaned from the three-word index should hold true for longer search phrases as well.

Our Findings

How keyword length and position affect average cost-per-click prices

How does CPC change with average position and the number of words in the searcher's query? This is an important and fundamental question. We are now able to answer this question using the index we've constructed.

In general, one would expect to pay 6.1 times as much to display an ad at the top of the search results page than they would at the bottom. However, this varies with the length of the targeted search phrase.

The table below shows the percentage increase in CPC the advertiser would typically have to pay to increase their average position by a single position. For instance, the average CPC would increase by 51% when displaying an ad in position 7.0 vs. position 8.0 for a one-word search query (a "broad" phrase). So if the advertiser was paying \$0.10 in position 8.0, they could expect to pay about \$0.15 in position 7.0. For a 3-word search phrase (a "niche" phrase), the CPC would increase from \$0.10 to only \$0.11 (10%).

Average position	Change in average cost-per-click			
	All words	1 word	2 words	3 words
1.0	36%	14%	21%	77%
2.0	23%	18%	23%	27%
3.0	25%	18%	31%	19%
4.0	27%	21%	31%	24%
5.0	24%	23%	27%	12%
6.0	31%	41%	25%	10%
7.0	42%	51%	26%	10%

The positions where we measured the highest increase in average CPC are highlighted in red. In general, we discovered that for broad keywords, advertisers would pay the highest incremental premium when bidding for the lowest positions (41-51% per position, as compared to 14-23% per position higher on the search results page).

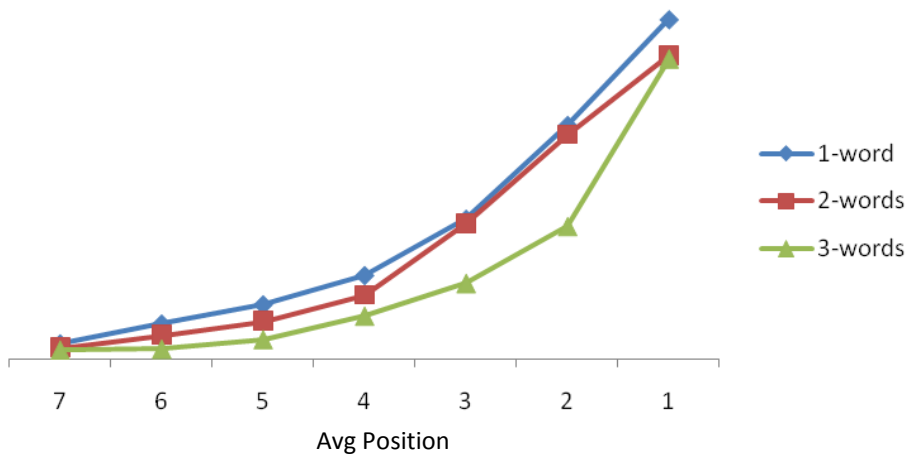
In contrast, for longer search phrases advertisers will typically pay the highest premium for the top position on the page (27-77% for the top two positions, compared to 10-24% lower on the search results page.)

There is an abundance of anecdotal evidence that most advertisers report the highest return for broad search phrases at the bottom of the page and for niche phrases at the top of the page. If true, we would expect advertisers to pay a premium for these positions and our findings are supportive of this theory.

The high price of these positions can perhaps be further explained by *visibility*. An ad shown at position 8.0 will be displayed 50% of the time on the first page and 50% of the time on the second page. As the ad moves upwards to position 6.0, it receives a disproportionate increase in first-page impressions. This is highly desirable for most advertisers, so they are willing to bid higher amounts for these positions.

That this bias is not observed for longer keyword phrases can be explained by the fact that broad search phrases tend to have far more advertisers bidding on them. There are fewer advertisers who target longer search phrases, so we would expect less competition for lower positions and thus, lower average CPC.

Average cost-per-click versus keyword length



The difference in CPC for broad vs. niche keywords is further illustrated by the graph on the left.

This chart shows that niche keywords are generally much cheaper to purchase on a relative basis than broad keywords – *up to a certain point*. At the top of the search results pages, niche keywords are just as expensive as broad keywords.

How keyword length and position affect clickthrough rate

Ads displayed higher on the search results pages are more visible. With visibility comes a natural increase in clickthrough rate.

Average position	Change in clickthrough rate			
	All words	1 word	2 words	3 words
1.0	23%	27%	12%	28%
2.0	38%	42%	35%	38%
3.0	54%	42%	62%	48%
4.0	37%	27%	29%	77%
5.0	27%	26%	24%	78%
6.0	84%	64%	76%	75%
7.0	14%	21%	4%	5%

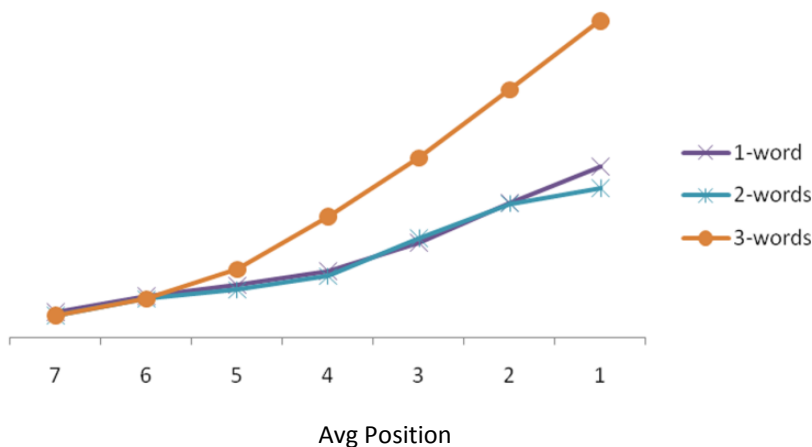
Some very interesting trends are revealed by this data. In general, we see a much larger relative increase in CTR for each change in average position than we do for CPC.

Across all keywords, we observed consistently high increases in CTR at position 6.0. This is partly due to the fact that at position 6.0, the majority of impressions for any given ad are on the first page of search results, and partly because only the top 6 ads are visible at the most common screen resolution (1024x768).

As with CPC, we measured a bias in CTR favorable to the advertiser with longer search phrases. For 3-word phrases, CTR jumped by more than 75% for positions 4-6. As before, this is likely attributable to the fact that there are fewer advertisers competing for placement in niche keyword phrases.

Finally, there appears to be a significant increase in clickthrough rate at position 3.0. This can probably be attributed to screen resolution; at 800x600 resolution, only the top 3 ads are visible on Google's search results pages.

Clickthrough rate versus keyword length



The difference in clickthrough rate for broad vs. niche keywords is further illustrated by the graph on the left.

CTR in general is much higher (nearly double) for 3-word niche phrases than it is for single-word broad phrases. This has profound implications for brand-name advertisers or other marketers who for various reasons may be insensitive to bid prices, as niche search phrases offer brand advertisers the best opportunity to generate a high volume of targeted traffic.

Using the model to forecast profitability of a keyword ad

The data generated by the search index is interesting, but only valuable insofar as it provides actionable insights which can guide search marketers to better profitability.

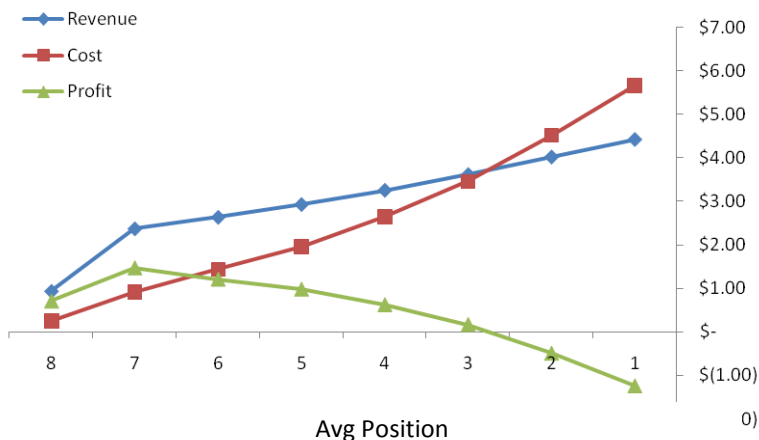
To this end, we constructed a simple forecasting model of CPC-based advertising. By providing common inputs such as impressions, CTR, CPC, order size, and so forth, the model would predict the profitability for each position on the search results page. Using this model, we can explore profitability by position and length of search phrase in order to extrapolate general strategies for keyword-based bidding.

Broad keywords

We began by modeling the behavior of broad, single-word keyword phrases using arbitrary values for the model inputs.

Obviously, these starting assumptions will not be representative of the vast majority of keyword bidding situations. However, a sensitivity analysis we performed on the model indicates that we can relax most of these assumptions and the basic insights they provide will continue to hold true under most conditions.

Predicted Profit for Broad Keywords



Our starting assumptions were as follows:

- 200 impressions per day
- 0.80% clickthrough rate at position 8
- \$0.15 Avg CPC at position 8
- 1.20% conversion rate
- \$49.00 average order size

These basic assumptions were plotted on the chart at the left.

Not surprisingly, we discovered that the most profitable positions were at the bottom of the search results pages, peaking around position 7.

But what if we change the assumptions? After all, the CTR for most advertisers will be much different, as will their average order size, conversion rate, and so forth.

We discovered that the model is insensitive to most of these variables. The variables which made an impact on the profitability were the starting bid price at position 8.0, conversion rate, and average order size.

Under most circumstances, the starting bid price at position 8 is unimportant. Higher starting bid prices shift the curve to the left, resulting in peak profitability at a lower position. Below position 7, however, traffic drops substantially as a greater proportion of the search ads will be displayed on the second page of search results. This situation is generally avoided by most serious search marketers.

Conversely, a lower starting bid price shifts the curve to the right, making it more profitable to bid at a higher position. The benefits of this are quite limited in practice, however. We assumed a starting bid price of \$0.15. This can be reduced only so far, typically no lower than \$.03 (in the best-case situation). This means that the curve can only shift to the right so far, resulting in a peak position no higher than position 6.

For these reasons, starting bid price is somewhat trivial in practice — it generally will only come into play for very expensive terms.

Conversion rate and average order size are a different story. Increasing either of these variables pushes the upper-half of the profitability curve significantly upwards. However, in most cases the increase in total cost far outweighs the increase in profitability, leading to little change in the curve.

Profitability increases with higher bids *only* if the conversion rate or average order size increases beyond a certain critical point. This inflection point occurs when the ***conversion rate x the average order size is greater than 10 times the starting CPC at position 8.***

Beyond this point, the profitability curve takes on a positive slope, which means that the advertiser will maximize their profits by bidding for the very top position, regardless of cost.

In practice, very few advertisers will meet these conditions. In the vast majority of cases, the point of optimal profitability for broad keywords occurs between positions 6-8. Above this point, it becomes increasingly unlikely that an ad will be profitable.

This leads to three general rules:

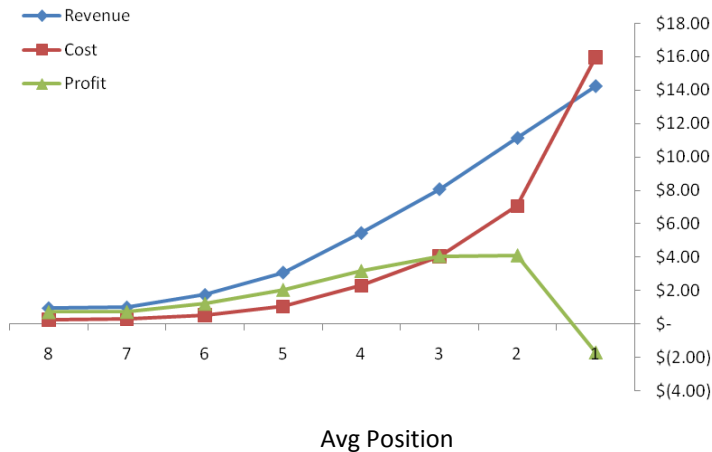
1. *For most broad keywords, the point of maximum profitability occurs around position 7.*
2. *If an ad is not profitable at position 7, it will likely not be profitable anywhere on the first page of search results. In these situations, advertisers should lower their bids or consider pausing advertising for the keyword altogether.*
3. *If Conversion Rate x Avg Order Size > 10 times the CPC at position 8, the bid should be increased until it shows up in the top half of search results. If it is profitable at the new (higher) position, it will likely continue to be profitable regardless of how high the bid price rises. In practice, this will be a rare (but fortuitous), occurrence.*

In short, most advertisers should bid modestly (if at all) for broad keywords. Only brand-name advertisers who are not managing their spend by ROI targets or advertisers with high conversion rates / average order sizes should consider bidding for top positions.

Niche Keywords

We followed the same methodology but used the model to simulate the effect of bidding on a three-word niche phrase:

Predicted Profit for Niche Keywords



We discovered that under most conditions profitability for niche keyword phrases is maximized around position 2 and then rapidly falls off. Position 3 tends to be just as profitable as position 2 in nearly all cases.

This stands in stark contrast to our predictions for broad keywords, where the point of optimal profitability almost always occurs near the bottom of the search results pages. This is because the average CPC increases more slowly than the CTR for niche phrases as the average position increases.

Like the broad keyword model, the niche keyword model was insensitive to most variance in the input conditions. For high combinations of conversion rate and/or average order size, the top position can become profitable. And of course, in cases of poor conversion rate or average order size, the curve shifts downwards to the point where it can become unprofitable to advertise at all. These conclusions are not unexpected or surprising.

Thus the general rule for bidding on niche keyword phrases is:

4. *For niche phrases, most advertisers should bid high enough to reach position 2 or 3, but no higher unless tracking confirms that the higher position remains profitable.*

Summary

The AdGooroo Search Index provides a means for search marketers to reliably predict how CPC and CTR will change based on the length of a search phrase and average position.

Our findings support the assertion that most performance-based advertisers should bid conservatively for broad search phrases and more aggressively for longer, niche search phrases. These advertisers in general have little to gain from bidding for the top spots on the search results pages, which in general will better serve larger advertisers seeking to maximize brand awareness.

Finally, the model provides a bidding strategy which can guide management decisions in situations where conversion tracking is not available or when sufficient clickthrough data is lacking. These rules are as follows:

1. *For most broad keywords, the point of maximum profitability occurs around position 7.*
2. *If an ad is not profitable at position 7, it will likely not be profitable anywhere on the first page of search results. In these situations, advertisers should lower their bids or consider pausing advertising for the keyword altogether.*
3. *If Conversion Rate x Avg Order Size > 10 times the CPC at position 8, the bid should be increased until it shows up in the top half of search results. If it is profitable at the new (higher) position, it will likely continue to be profitable regardless of how high the bid price rises. In practice, this will be a rare (but fortuitous), occurrence.*
4. *For niche phrases, most advertisers should bid high enough to reach position 2 or 3, but no higher unless tracking confirms that the higher position remains profitable.*