

## OVERVIEW

This past summer, just before leaving MIT for a teaching job outside Dubai, I collected some data for an empirical study on blog advertising. The specific objective of the study was to determine the strongest predictors of the revenue earned by ads appearing on blogs. In short, my findings are as follows:

- 1) **the number of weekly page views** (WPV) is a much stronger predictor of weekly ad revenue and price than are either the number of inbound links or the number of blogs providing those links
- (2) **the number of ads** has a negative impact on ad price and a largely positive effect on ad revenue, and
- (3) **the political orientation** of the blog matters: on average left-of-center blogs significantly out-earn their right-of-center counterparts.

## RESEARCH DESIGN

The study's design is quite straight-forward. The first step was to gather data from the website of BlogAds, a North-Carolina-based company serving banner ads to over 1000 blogs covering a wide variety of topics and focus areas. One unusual feature of the BlogAds website is the wealth of detailed information it contains about each blog (page views, URL, topic/focus), its blogger (age, gender, state/country of residence, political orientation) and the blogs' ads (the number, kind, and position of ads, as well as their price). Two pieces of information- the price and the number of ads- were particularly valuable because together they can be used to calculate the total ad revenue for a given blog. I am aware of no study to date which has used this figure in analyses of blog or internet advertising.

## DATA

With data in hand on 1357 ads appearing on 491 blogs, I next set about to develop and test a statistical model to estimate how well three groups of factors explain the differences in revenue across these blogs. Those factors were:

- (1) the blog's **popularity**, as measured by the number of weekly page views it receives and the number of sites that link to it
- (2) the blog's **ad count**, as measured by the number of ads appearing on the blog, and
- (3) the blog's **political orientation**, as indicated by my categorization of the blog as either right-of-center or left-of-center

## ANALYSIS

I used a technique known as multiple regression analysis to determine how well the above three factors explained the variation in the ad revenue. Since most readers are probably not familiar with this technique, I have endeavored to describe all results in plain English rather than with regression statistics and other technical jargon. Table 1 below contains summary statistics of the data.

**Table 1 Summary Statistics**

Variable	N	Mean	Standard Dev.	Min	Max
Ad Price	491	\$74	\$256	\$10	\$5000
Ad Revenue	491	\$215	\$741	\$10	\$14,100
Weekly Page Views	491	98,475	318,782	3053	5,259,057
WPV < 10K	165	-	-	-	-
10K < WPV < 100K	236	-	-	-	-
100K < PV < 1,000K	83	-	-	-	-
WPV > 1,000K	7	-	-	-	-
Linking Sites	491	622	1,014	1	10,078
Number of Ads	491	2.8	23.7	1	16
Political Blogs	194	0.40	-	0	1
<i>Left-of-Center</i>	84	0.17	-	0	1
<i>Right-of-Center</i>	110	0.22	-	0	1
Gender = Male	422	0.86	-	0	1
Country = USA	446	0.91	-	0	1
<i>State = Blue '04</i>	288	0.59	-	0	1

Several aspects of the data summarized in Table 1 are noteworthy. First of all, observe the wide range of prices of BlogAds- \$10 on the low end and \$5,000 on the high end. Many blogs run more than one ad, thereby making the highest weekly revenue figure over was \$14,000.

Next, note that while the average number of page views is nearly 100,000 per week, the standard deviation is three times as large. This indicates that the distribution of page views is highly-dispersed and that there may be extreme outliers at the higher end of the distribution. This is, of course, the case: weekly page views range from just over 3,000 to well over 5 million. This same over-dispersion holds true for Ad Price and Ad Revenue, as well. The table also indicates that the average number of ads is small, just 2.8 per blog. There are notable exceptions: two blogs run 16 BlogAds, one has 14, three others have 10 or 11. Finally, several of the political and demographic variables are worth pointing out.

- As is the case with the blogosphere more generally, the sample is overwhelmingly male and located in the USA.
- While many more blogs could be classified right-of-center (110) rather than left-of-center (84),<sup>1</sup> blogs from states that voted “Blue” in 2004’s general election comprise a majority of the sample, almost 60%.
- While not comprising the absolute majority (40%), the percentage of political blogs is higher than the amount devoted to popular culture & entertainment (20%), religion (<2%), law, business, and economics (<2%); food (2.5%), and sports (4%) combined.

<sup>1</sup> In making this determination, I relied primarily, but not exclusively, on BlogAds™ classification of blogs into various “networks”, as shown here: <http://www.blogads.com/advertise/order>

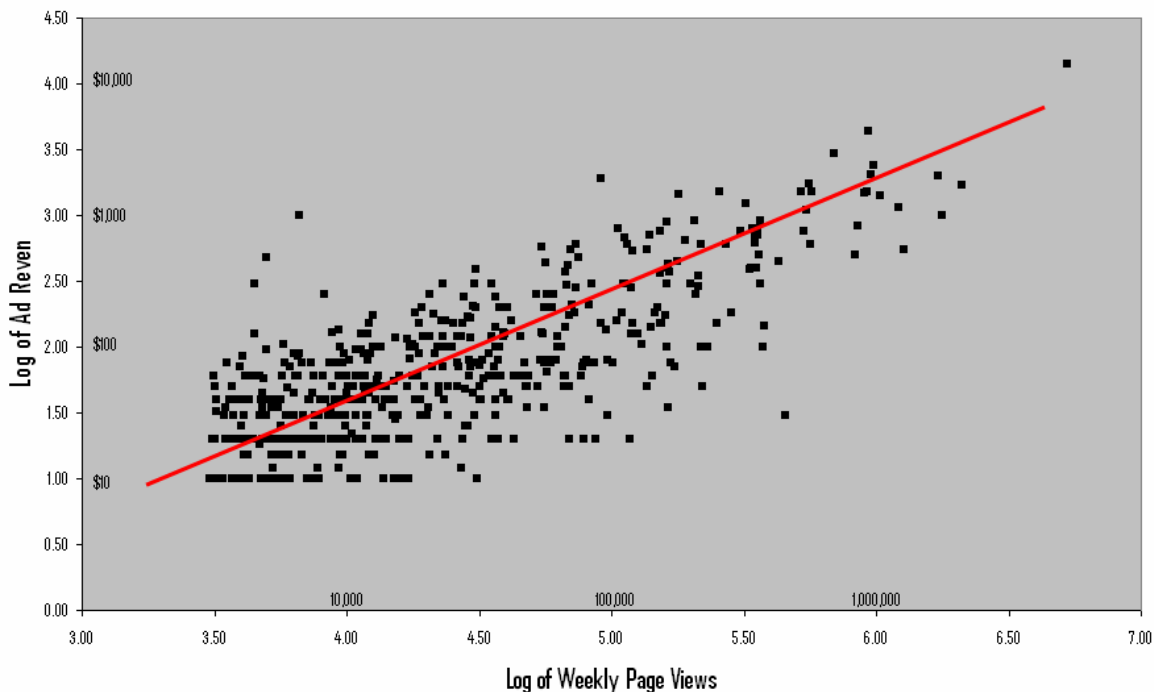
## RESULTS

### Page Views vs. the Number of Inbound Linking Sites

The first question I examined was whether the number of page views or the number of inbound links<sup>2</sup> was the stronger predictor of ad revenue. Historically, traffic has been the preferred variable used to set advertising rates in both print, television, and online media. And despite the fact that link popularity has recently been touted as a means to estimating the value of blogs<sup>3</sup>, my intuition is that link popularity does a good job of predicting ad revenue, but a *relatively* poorer one than does the number of page views. The data support this hypothesis: the log of the number of page views explains about 58% of the variation in revenue while the number of links explains about 21%. Thus, while both are very strong predictors, page views explains nearly three times as much of the variation in revenue.

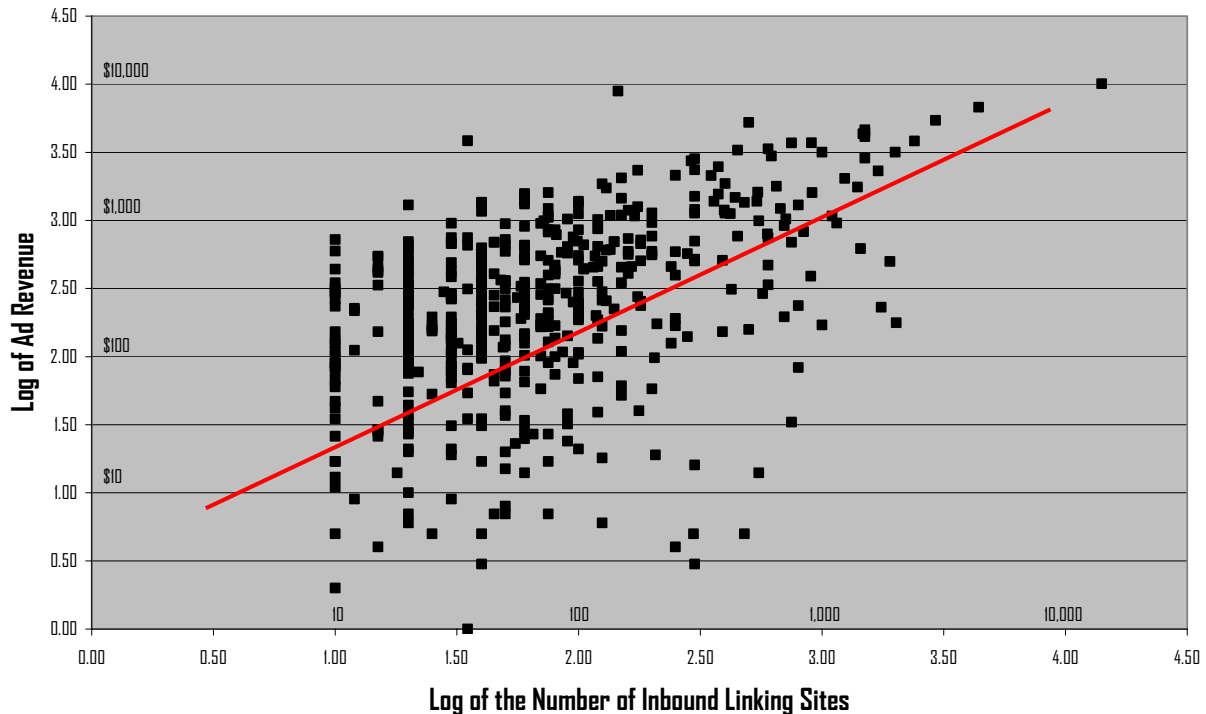
The graphs in Figures 1 and 2, below, demonstrate the relative superiority of page views over inbound links as a predictor of ad revenue. As we can clearly see, the data points are much closer to the red regression line in Figure 1, where Page Views are used to predict ad revenue, than in Figure 2 where inbound links are used. The greater dispersion of points around the line in Figure 2 indicates that inbounds links explain less of that dispersion than do page views.

Figure 1: Ad Revenue vs. Weekly Page Views



<sup>2</sup> The number of inbound links were obtained from the Technorati search engine, <http://technorati.com>.

<sup>3</sup> <http://www.business-opportunities.biz/projects/how-much-is-your-blog-worth/>

**Figure 2: Ad Revenue vs. The Number of Inbound Linking Sites**

### The Number of Ads

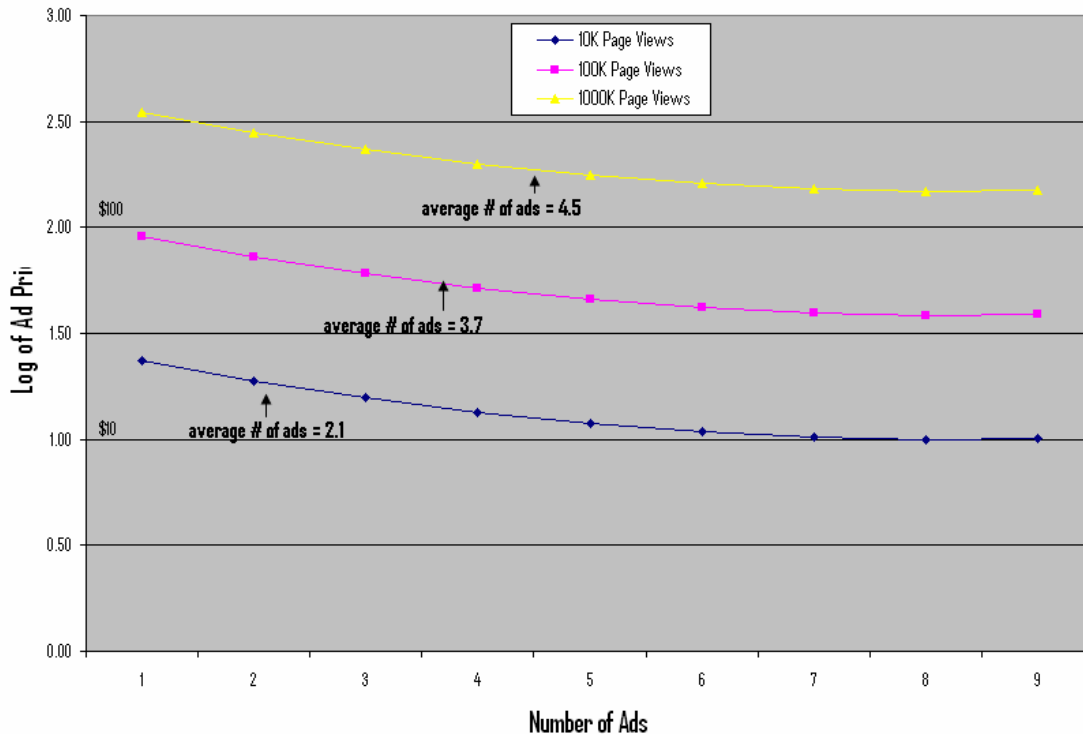
The second question I investigated concerned the impact of the number of ads on revenue. In general, I think that the number of ads would have a decreasing effect on the price charged for that ad and a generally positive effect on the blog's ad revenue. Here's why. A decade after the advent of the first browsers, there is still this lingering question about whether and to what degree media in cyberspace and physical space adhere to the same economies of (re)production and distribution. As anyone who has read a blog or online newspaper knows, page and space limits are not quite the same in online and print media. For one thing, any number of ads can be placed down the sidebar of a website or blog. Also, premium ad space can be effectively multiplied through ad rotation. Neither of these things are possible with print media, however.

But if ads are not rotated, ads on blogs and websites can be placed so far down the "page" that they are "below the fold" and their chances of being seen are greatly reduced. Thus, it is not hard to envision a situation where a blog receives \$60/ad when hosting five ads but receives less, perhaps only \$50 per ad, when it has six. Here, the revenue would be the same for both conditions because  $5 * \$60 = 6 * \$50 = \$300$ . And we could further envision a situation where the price would further drop to, say, \$40/ad when there are seven ads. Under such a scenario, the blog would actually earn less with seven ads than it did with five or six.

So, should it be the case that ad price drops off very rapidly as the number of ads increases, it would underscore the importance of giving careful consideration to the number and/or placement of ads on blogs. And should the revenue increase at a decreasing rate with every additional ad, it would strongly confirm one important point of similarity between online and print advertising- that space matters, even in cyberspace.

Once again the data supported my hypothesis. The graph contained in Figure 3, below, indicates that ad prices do decrease as the number of ads increases. Interestingly, this finding holds for blogs averaging 10K, 100K, and 1,000K weekly page views.

Figure 3: Ad Price vs. the Number of Ads



Also worth noting is presence of an “inflection” point in the graph for ad prices, i.e. a point where the price stops declining. According to the model, the ad price decreases steadily between the 1<sup>st</sup> and 7<sup>th</sup> ad and then remains constant, thereafter.

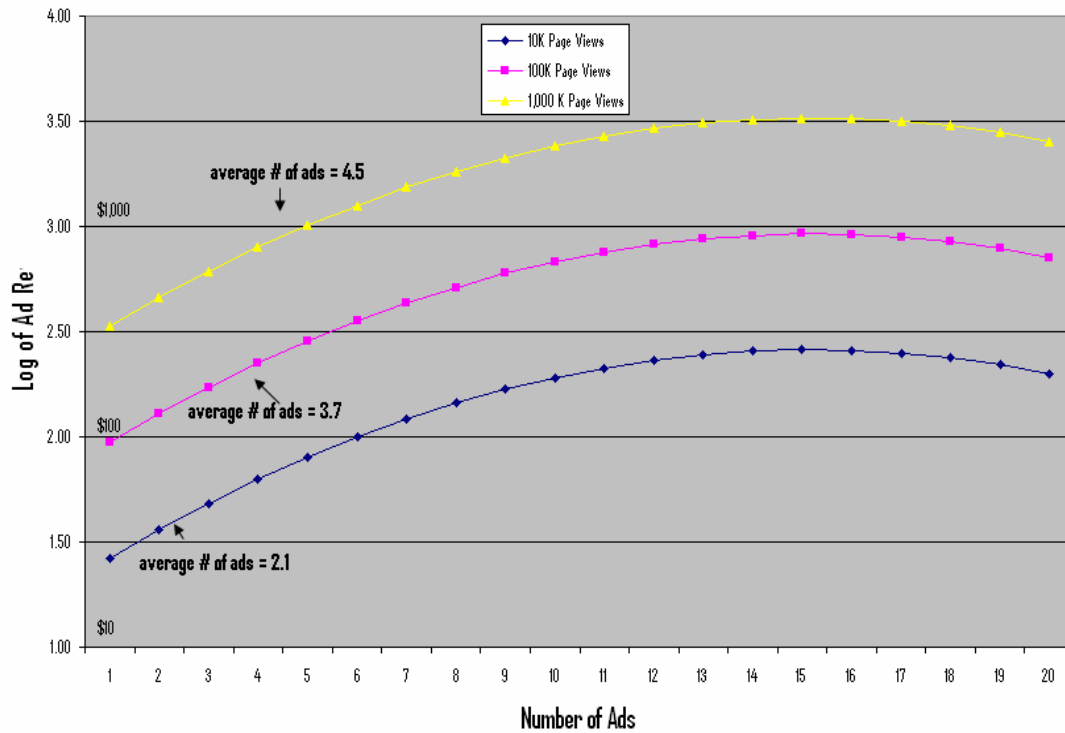
It is further interesting to see that for each group of blogs, the average number of ads increases with page views: blogs averaging 10K page views run only 2.1 ads, those averaging 100K run 3.7, and those averaging 1,000K, 4.5. These averages are well below the inflection points of 6-7 ads.

The graph in Figure 4, on the next page, shows the relationship between ad revenue and the number of ads. As expected, revenue increases with every additional ad but the increases grow smaller with every one of them. One difference between the price and revenue graphs is the location of the inflection point: revenue doesn’t level off until 14 ads appear on the blog and doesn’t turn negative until there are 17 ads. This suggests that there is unused carrying capacity for BlogAds, i.e. that there is “space” for more ads. Whether there is demand for them is another matter.

Thus far, only one blogger has either figured out that the “magic number” is 14 or has attracted enough of a devoted audience that the number of ads on his blog rose to this optimal number. <sup>4</sup>

<sup>4</sup> If that blogger doesn’t mind my revealing this fact, along with his name, I will share this information with readers of this report. Also, I should note that one potential explanation for why the average number of

Figure 4: Ad Revenue vs. the Number of Ads



Finally, it is worth noting that the number of ads explains an additional 15% of the variation in revenue not explained by page views, roughly ¼ the amount of the latter. Taken together, page views and the number of ads explains over 70% of the variation in the ad revenue, a very substantial amount.

### Political Orientation

My final question pertained to whether or not political orientation explains variation in ad revenue. It is generally accepted that, when compared to those focused on sports, food, and pop culture, politically-oriented blogs have generated more controversy, attracted larger and more devoted audiences, and have garnered the lion’s share of ad revenue. These facts gives rise to two related but distinct questions: (1) whether political blogs have higher ad revenue than other blogs and (2) whether “left” and “right” of center blogs have different ad revenues. Below, I present results just for the second of these two questions.

As can be observed from Table 2, on the next page, left-of-center (LOC) blogs have higher average ad revenues (\$511) than right-of-center (ROC) blogs (\$185). Interestingly, this difference is not uniform over the entire range of page views. From 3K up to 100K page views per week, LOC blogs yield significantly higher revenue. In the middle range, i.e. 100K-1,000K page views, there is a surprising reversal. Here, there are many fewer ROC blogs (6) than LOC (18) yet, the former now have significantly higher revenue (\$557

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BlogAds™ run well below the inflection point is that there are also other ads from other services on the page, e.g. from Google.

vs. \$452). At the very top end, however, the LOC dominance returns, and powerfully so: at the time I collected the data (August 2005), there was not a single ROC blog with over 1 million page views per week. In stark contrast there are three LOC blogs that do, and, on average they receive over \$5700 per week in ad revenue!

**Table 2 Average Ad Revenue for Various Categories of Blogs**

Page Views	Avg. Revenue: All Blogs (Count)	Avg. Revenue: Political blogs (Count)	Avg. Revenue: Right-of-Center (Count)	Avg. Revenue: Left-of-Center (Count)
3-10K	\$47 (165)	\$39 (54)	\$32 (36)	\$53 (18)
10-30K	\$71 (133)	\$75 (66)	\$63 (43)	\$97 (23)
30-100K	\$149 (104)	\$229 (35)	\$183 (21)	\$298 (14)
100-300K	\$356 (52)	\$477 (25)	\$557 (6)	\$452 (19)
300-1000K	\$1,048 (31)	\$1,734 (11)	\$2,331 (4)	\$1,393 (7)
>1000K	\$3,129 (7)	\$5,733 (3)	\$0 (0)	\$5,733 (3)
All	\$215 (418)	\$326 (194)	\$185 (110)	\$511 (84)

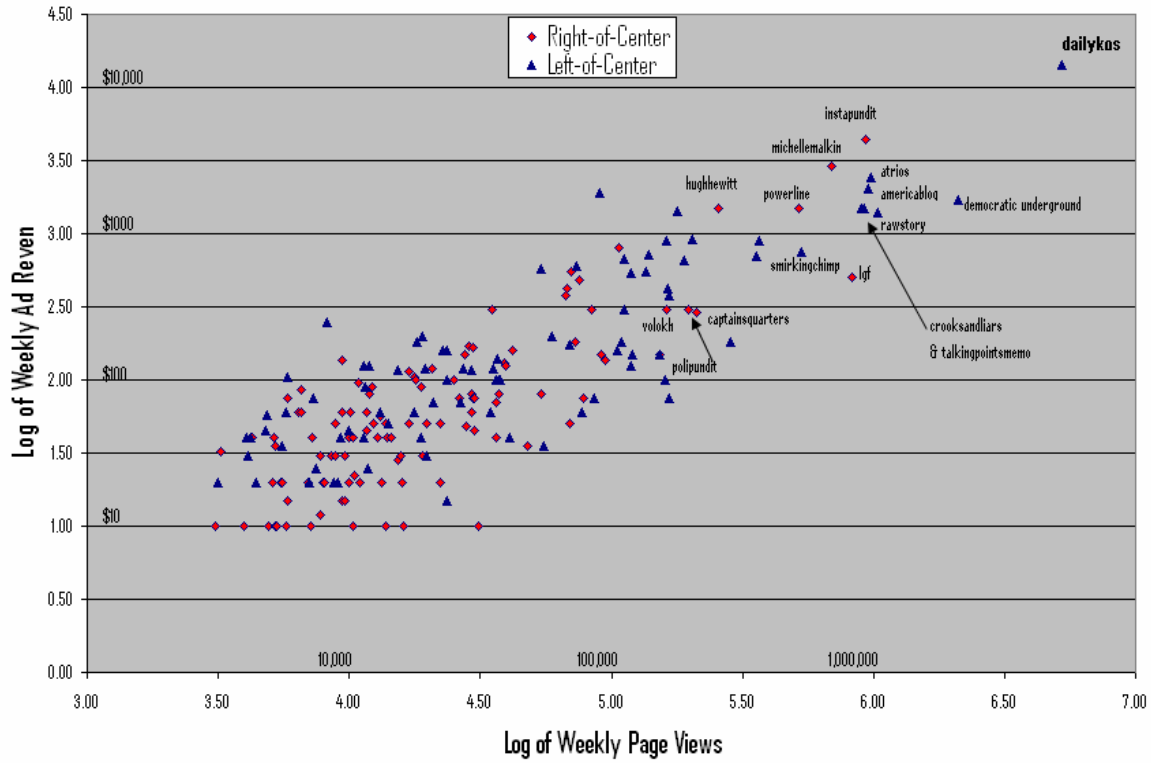
The graph in Figure 5, on the next page, displays the relationship between ad revenue on *political* blogs and the number of page views. Several interesting observations can be made. First, take note of just how much the top blog, The Daily Kos, out-distances all others in terms of page views and ad revenue. This is part of a larger trend wherein LOC blogs, represented by blue triangles in the graph, dominate the upper, right-hand quadrant of the graph and are almost alone around and above the 1,000K page views levels. Despite these pronounced differences, political orientation explains only 7-9% of the variation in revenue, about ½ that of the number of ads and just one-seventh of that accounted for by page views.

Secondly, we can observe that four ROC blogs stand out in the zone above 500K weekly page views- Little Green Footballs, Instapundit, Michelle Malkin, and Powerline. These four blogs are able to earn, on average, 67% more per week than their seven LOC counterparts (Raw Story, Washington Monthly, Smirking Chimp, Talking Points Memo, Crooks and Liars, America Blog, and Atrios). Interestingly, a fifth ROC Blog, Hugh Hewitt's, earns more ad revenue on 250K page views per week than does any of these seven LOC blogs, each of which has from 2 to almost 4 times the weekly page views. Why the ROC blogs are so dominant in this region is a question that warrants closer investigation.

Finally, note that across the entire page view range, the blue triangles are generally higher than the red squares, thereby confirming the data in Table 5 that showed average revenue of LOC blogs to be higher than that for ROC's. This is especially significant when we add to it the observation that ROC blogs, on average, also under-earn the sample of blogs as a whole. Three explanations come immediately to mind. First, there are more ROC than LOC blogs. Competition among ROC bloggers could be suppressing ad prices and revenue. Secondly, advertisers may perceive lower levels of disposable income or propensities to buy goods online among the readers of ROC blogs, leading advertisers to either offer less for the same ads when they appear on ROC blogs than when they appear on LOC blogs. Third, it is possible, even likely, that the goods

and services being promoted via LOC and ROC blogs are entirely different. Doubtless it is that there are other explanations beside these.

Figure 5: Ad Revenue of Political Blogs vs. Weekly Page Views



## SUMMARY OF FINDINGS

- (1) **Traffic Is King.** Page views are the strongest of the three predictors tested: it explains at least twice the variation in ad revenue that either the number of inbound linking sites, the number ads, or the political orientation do. Taken together, page views, the number of ads, and political orientation explain over 80% of the variation in the ad revenue, a very substantial amount. This indicates that the statistical model predicts ad revenue with a high degree of accuracy. Doubling the weekly page views results in a 50% increase in ad revenues.
- (2) **Space Matters, Even in Cyberspace.** Holding page views constant, the average effect of adding one more ad is a 20% decrease in price and a 40% increase in revenue. Interestingly, the number of ads on most blogs is well below the number where returns to revenues become negative, i.e. the point where increasing the number of ads results in less, rather than more, revenue.
- (3) **Partisanship Pays, But Unequally.** When controlling for both the number of weekly page views and the number of ads, politically-oriented blogs generate no higher ad revenue and command no higher ad prices than other blogs. However, revenues from ads on left-of-center (LOC) blogs are 40% higher than average while their right-of-center (ROC) counterparts' revenues are 23% less. There are notable exceptions to this general trend, however. While LOC blogs dominate at both the lower (below 100,000) and the upper (above 1 million) ends of the weekly page views continuum, ROC blogs earn much more in the middle territory.