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Application for the NBER PIE Program Research Grant

The way consumers search for businesses has changed remarkably over the past two decades. Traditionally, local yellow pages served as the primary venue for seeking out providers; more recently, listings on the Internet have supplanted printed directories. As information gatekeepers fundamentally influence the functioning of two-sided markets, this pronounced shift in the relative popularity of platforms poses several important economic questions related to the digitization of consumer search. First, what underlying market characteristics correlate most strongly with consumers' migration to online search? Second, does a transition to online search necessarily alter the way consumers find providers? Third, how do firms respond to shifts in the types of search platforms favored by consumers?

I propose to study these questions by building on my previous research using a newly constructed dataset uniquely suited to the task. In a pervious paper, I showed that firms act strategically to attract customers, either by choosing names that appear first in directory listings or by advertising extensively.[1] As an extension of my main results, I showed that this strategic behavior and its attendant implications also hold for online search: advertising on Google is correlated with the same type of firm characteristics as offline advertising. Moreover, some correlations have weakened over time – namely, the link between a firm's name choice and its quality – presumably due to the ascendancy of online review sites. These results were not fully developed in my previous paper, however, as they were beyond the main topic of interest and I lacked the requisite data to conduct a satisfactory study.

As a first step in tackling these new questions, I have collected a panel of yellow pages' listings for every business category in every U.S. city spanning the period 1997-2013. Importantly, the data cover both the advent of the Internet when search was beginning to move online, as well as the more recent era where online search has mostly driven out the yellow pages. From a cursory analysis of the panel, some initial findings are intriguing and suggest a path for further study. For instance, the share of plumbers using names that start with an A has actually increased nationwide between 1997 and 2013, moving from 10.3% to 13.6% despite the waning relevance of alphabetically sorted directories. This pattern seems loosely correlated with Internet penetration: the share in San Francisco and Boston increased from 8.9% to 11.0%, whereas in Detroit and Cleveland it moved from 15.3% to 16.9%. Understanding the economic mechanisms driving these dynamics, both across markets and for categories beyond plumbing, will serve as a primary goal of my work.

[1] McDevitt (2014), "A Business by Any Other Name: Firm Name Choice as a Signal of Firm Quality," *Journal of Political Economy*.

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Speculatively, a revealed preference argument seems to underpin these results. Sophisticated firms anticipate how consumers engage with search platforms, and thus act strategically to position themselves most advantageously within listings. The gains from doing so, however, vary across markets depending on the underlying tendencies of consumers. In some markets, for instance, consumers will be more predisposed to search from the top down, making the use of A names a more effective strategy. In others, consumers may rely more on advertising to seek out providers, prompting firms to spend more on this form of marketing. In still others, word-of-mouth may predominate, rendering the yellow pages a mere repository of phone numbers and prompting firms to favor other methods to attract customers.

Given this motivation, I will use the initial search characteristics in the market, as suggested by firms' choices in 1997, to test whether they predict the subsequent evolution of online search platforms within that market. For instance, in markets where firm choices suggest consumers tend to favor top-down search, the premium for the first slot in a Google position auction should be highest. Likewise, in those markets favoring word-of-mouth search, analogous online platforms like Angie's List should now be more popular. For this analysis, using a long panel will be crucial in order to difference out confounding market- and category-level unobservables, as identification of the main effects will come from variation across markets over time and cross-sectional variation across categories within markets.

In addition to being an interesting research question in and of itself, these findings have broader practical relevance. First, they will provide insight into which markets will be most attractive for which types of marketing. Second, and related, as new types of platforms emerge – such as the "app" economy – the same type of evolution may prevail: an app hoping to penetrate a "word-of-mouth" market may do well by tying into Facebook or other social networks, whereas a "top-down" market might favor auctioning off listings for the highest spot at a premium à la Google.

With an NBER grant, I would acquire (either through direct purchase or form the work of an RA) the necessary data to supplement and complete this analysis. Specifically, this project will require data on usage from directories such as Yelp and Angie's List, along with Google position auction rates across categories and markets over time. Finally, my project appears to fit the stated criteria of the grant well, as it will directly study "the causes behind the growth of digital technologies and the consequences from their increasing use," as well as "how new models of advertising alters the shape of online activities."