

NBER Digitization Tutorial 2016 Application

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I am currently in the fourth year of an Economics PhD program at the University of Toronto, with an expected graduation year of 2017. As part of this program I completed two years of coursework in microeconomics, macroeconomics and econometrics, as well as field specialization in the theory and empirics of Industrial Organization. I passed the Industrial Organization comprehensive exam with distinction. My major field is Industrial Organization, and my other fields are applied econometrics and applied microeconomics. My dissertation committee currently consists of Victor Aguirregabiria (chair), Avi Goldfarb, and Heski Bar-Isaac. Very broadly, I am interested in firm competition, innovation, and strategy. The topic of my proposed job market paper concerns the intersection of search and competition in online markets.

The intersection between internet search and competition received a substantial amount of regulatory attention in recent years with multiple cases brought against Google in European and North American courts. These cases hinge, in part, on the claim that Google biases search results to promote its own products at the expense of its competitors products - which potentially forecloses entry. This relates to a broader idea about the importance of consumer information in online search markets and how that affects firm entry and innovation incentives. In markets where consumers engage in costly search among thousands (or hundreds of thousands) of competing products, discoverability - the ability of consumers to easily find a particular product - is important in determining firm entry and investment incentives.

From an Industrial Organization perspective, this raises some important questions: How does the ease of search (i.e. search costs), and the information available to consumers in online search markets affect the number of products that firms enter into the market (product variety)? How do search costs affect the types of products that firms enter into the market?

My empirical setting is the Google Play Store for mobile apps - a large and rapidly growing market, which is also representative of the key characteristics of online search markets: It has a large number of products (over 1.5 million), and a restricted and directed search process - on the Google Play Store, the primary method of consumer search is to browse through "bestseller" lists which display the most successful apps in particular categories.

To empirically test my main questions I take advantage of a plausibly exogenous shock in the structure of the Google Play app marketplace, where Google Play switched from having 6 category lists for mobile games to 20 lists in March 2014. Google kept 3 of the categories intact, but split up the remaining 3 into 17 new categories. The importance of the split is that in this setting, the number and composition of bestseller lists reflects the costs of consumers searching for new products. For example, if a bestseller list has products from categories A and B, which are poor substitutes, consumers with a preference for a product from category A may have to spend time browsing through irrelevant products, and may not reach some of the lower ranked but still relevant products. As a result, firms may not want to enter products into these categories, or would underinvest in the products they do enter.

Using monthly data from the Google Play store from January 2012 to December 2014, I examine

the number of new apps in the split and non-split categories, and the prices of apps. My results suggest that entry increases in the period after the split in the split-categories relative to the non-split categories. This result holds at the firm level - individual developers were more likely to enter apps into the split categories relative to the non-split categories after the split. Moreover, the results show that the increases in entry were largest for the smaller categories - suggesting that the search-costs story is correct. In addition, I find that average prices increased in the split categories relative to the non-split categories after the split. However, this variation is coming entirely from a composition effect - after the split, developers entered higher priced (and higher value) apps into the split categories. This is consistent with the idea that lower search costs allow for consumers to make higher quality matches, which allows firms to enter more high value products (a la Bar-Isaac, Caruana and Vicente 2012).

My paper has two key contributions to the literature. First, it presents concrete evidence about the changes in firm entry incentives in response to changes in consumer search costs in search markets. Previous literature (e.g. Zentner, Smith and Kaya 2012, Waldfogel 2011) present some evidence of more entry in response to lower search costs, but these studies identify these effects over a long period of time and the identification is not entirely clear. By contrast, I have a clear change in market conditions that results in lower search costs. Second, I empirically examine the effect of search costs on product selection - the type of products firms enter into the market - showing that firms enter higher priced products with lower search costs. While there is some theoretical work on this topic, there is very little empirical evidence.

In summary, my proposed research will shed light on firm strategy in terms of entry and product selection in online search markets. I believe that attending the 2016 NBER Digitization Tutorial would substantially benefit me by exposing me to the most recent research in an area I am interested working in, as well as discussing and improving my own research in the field with leading experts and other interested students.

References

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