How do "Big-Box" Entrants Influence Competition and Productivity in local food retailing?

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Background

Products from the food sector fulfill our needs for basic survival and are purchased by almost everyone in the society. The major structural change in retail markets during the last few decades is in fact the entry of large ("bigbox") stores, along with a drastic fall in the number of stores. The most striking example is the expansion of Wal-Mart, which has been found to greatly lower retail prices, and increase exit, of retail stores in the U.S., the "Wal-Mart effect". For instance, the number of single-store retailers in the U.S. declined 55% from 1963 to 2002 (Basker 2007). Retail markets in Europe also follow the "big-box" trend, though on a smaller scale, with for example Carrefour, Metro, Schwartz, and Tesco. Foster et. al (2006) find evidence that the aggregate labor productivity growth in U.S. retail is mainly driven by reshuffling of resources from less to more productive stores as chains replace small stores with large ones. Although there is an emerging literature about retail markets, the impact of this structural change on productivity has not been given much attention. In Sweden there is a lack of knowledge regarding the competition effects caused by large entrants (Swedish Competition Authority, 2004:2).

The role of large entrants has a direct link to competition policy because the majority of OECD countries have entry regulations. The main rationale is that new entrants generate both positive and negative externalities, which require careful evaluation by local authorities. Advantages, such as productivity gains, lower prices, and wider product assortments, stand in contrast to drawbacks, in terms of fewer stores, and environmental issues. The consequences of regulation (e.g. supermarket dominance) are frequently debated among policy makers in Europe. In Sweden, Plan- och Bygglagen(PBL) is claimed to be one of the major entry barriers to the market resulting in various outcomes, e.g. price levels, in different geographical markets (Swedish Competition Authority, 2001:1; 2004:2). How large entrants influence market competition and productivity growth has, anyhow, not been analyzed in detail. The current project, therefore, aims to fill this gap.

Purpose

The purpose of this research project is to use a dynamic structural model to estimate total factor productivity (TFP) in the Swedish retail food market, and to examine how entry of large ("big-box") stores influences exit and productivity growth. That is, to what extent do large entrants drive reallocation of inputs and outputs, i.e., exit of low productive stores and growth of surviving stores with different positions in the productivity distribution? In addition, we also provide a decomposition of the relative contribution of entrants, exits and incumbents to aggregate productivity growth in the Swedish retail food market from 1997 to 2002.

Method

Recent methodologies focusing on sales generating functions are motivated by the access to firm level panels and a desire to analyze the efficiency impacts of major changes in the environment e.g. deregulation, changes in tariffs, privatization etc. We follow this research and derive a dynamic structural model for retail markets to estimate productivity. Our model takes imperfect competition and geographical differentiation into account.

Our research methodology accounts for the fact that the changes in productivity in large part determine how stores respond to the changes being studied and these must be taken into account in the estimation procedure. We have the opportunity to distinguish the impacts of the changes related to (i) the efficiency of the output allocation among stores, and (ii) the productivity of individual stores.

In the data, we observe both entry and exit, and largely serially correlated differences in "productivity" across stores and markets that lead to worries about; First, endogeneity of inputs i.e. that stores whose productivity is positively affected by the change grow and increase input demand; Second, store selection i.e. stores with high

capital are more likely to survive even if they receive a large shock to productivity. These two points are central to consider when we analyze the responses to structural changes in local markets due to large entrants.

Recent econometric tools (semiparametric techniques) enable computationally simple estimators for problems that are very complex, i.e. those that allow market interactions, and require only minimal assumptions on how input and exit choices are made (Olley and Pakes 1996, Ackerberg et. al. 2007, Doraszelski and Jaumandreu 2009).

Our method is based on recent extensions of the Olley and Pakes' (1996) framework that allows for heterogeneity and interaction between stores. We rely on the following key features of the retail food market: First, the most common characteristics of retail data are lumpy investments and a weak measure of intermediate inputs. While Olley and Pakes (1996) back out unobserved productivity from investments, Levinsohn and Petrin (2006) use the intermediate input of materials. Because labor and capital are key inputs in retail markets, we follow Doraszelski and Jaumandreu (2009) and recover productivity from the optimal choice of labor. Second, because retail stores operate in local markets we control for local market characteristics, i.e. for large entrants and population density when estimating productivity. We use political preferences in local markets to control for endogeneity of large entry. Third, because large stores are more likely than smaller ones to survive larger shocks to productivity we control for selection, as do Olley and Pakes (1996). Fourth, recent literature emphasizes the importance of controlling for prices when estimating production functions in imperfect competitive markets (Foster, Haltiwanger, and Syverson 2008, De Loecker 2009). Since retail prices and quantities are rarely observed at the store level, we control for unobserved prices by introducing a simple demand system as in Klette and Griliches (1996), and thus obtain mark-up estimates.

We use two data sets for the period 1996 to 2002. The first data set, collected by Delfi Marknadsparter AB, contains all retail food stores in Sweden and defines a unit of observation as a store based on its address. The second data set, collected by Statistics Sweden, contains all organization numbers belonging to SNI code 52.1, "Retail sales in non-specialized stores". We merge municipality data to both data sets.

Results

When estimating productivity in retail, it is central to control for prices and local market characteristics such as large entrants and population density. It is also important to control for selection and to allow current productivity to affect future productivity depending on a store's productivity ranking.

The results show that the Swedish retail food market is characterized by increasing returns to scale, with an elasticity of scale parameter of 1.40. Our method has the advantage to provide estimates of both demand elaticities and mark-ups at the industry level. The demand elasticity is found to be about -3, and the average industry mark-up (price over marginal cost) about 1.5.

The findings related to the role of large entrants show that entry of large stores forces low productive stores to exit and increases productivity growth among surviving stores. Stores with high productivity and capital stock are less likely to exit, in line with both theory and previous empirical findings. Exit is 0.29 percentage points more likely if a store has productivity in the bottom part of the productivity distribution than in the middle group. Large entrants thus have a different impact on exit behavior depending on where in the productivity distribution a store is located and exit is more likely to occur from the bottom part of the distribution.

Large entrants also influence productivity growth among surviving stores. On average, large entrants increase productivity growth of incumbents. Moreover, large entrants have a different impact on incumbents depending on their productivity levels. Productivity growth increases most among low productive stores that survive and the effect then declines with the productivity level. A large entrant, on average, increases productivity growth by 14 percent if a store is among the 10 percent of stores with lowest productivity, compared to being in the middle of the distribution. The increase is about half for stores with somewhat higher productivity. On the contrary, productivity growth decreases 7 percent if an incumbent is among the 10 percent of the stores with highest productivity, compared to the middle group. Large entrants thus increase productivity growth of surviving stores and the magnitude of the increase is largest for low productive stores.

The decomposition shows that aggregate productivity growth in the Swedish retail food market was 8 percent from 1997 to 2002. Incumbents that increase their productivity stand for a substantial part of the growth together with net entry.

We conclude that large entrants play a crucial role for driving productivity growth in the Swedish retail food market. We argue that a more restrictive design and application of PBL can hinder reallocation towards more productive units and thus hinder aggregate productivity growth. Note however that we clarify the indirect link between regulation, large entrants and productivity because we do not access the numbers of approvals and rejections in PBL. Besides productivity, PBL compounds other aspects such as increased traffic and broader environmental issues that need to be balanced against the increase in productivity growth.

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