(Extended Abstract)
Spatial competition and asymmetric information:
Evidence from the Swedish market for dental care

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Abstract
This paper analyses spatial competition on the market for dental care services using
matched patient-dentist data, covering almost all dental care consumption in Sweden during
3 years. The data contains location of dental clinics, allowing for a more dynamic definition of
markets than previous literature. I analyze price differences across markets for dental services
that differ in the amount of information asymmetries between the patient and the dentist.

1 Introduction
Many OECD countries have undertaken reforms over the past decades in order to
increase competition in the health care sector. Some reforms has been motivated as
a way of increasing consumer choice, while others as a means of improving efficiency,
by reducing health care costs without reducing quality (Docteur and Oxley, 2003).
The most prominent example of the latter is the health care industry in the United
States, where competition among providers through managed care has been shown
to obtain lower prices (Drano and Satterthwaite, 2000). However, the market and
regulatory conditions in the United States are unique and experiences of competitive
health reforms in other countries are less positive. On the other hand, efforts to
improve competition in other countries have been interrupted by opposition from
patients and providers, while longer time periods may have been needed in order to
obtain the intended results (Docteur and Oxley, 2003).

As pointed out by Arrow (1963) several decades ago, there are certain features
of markets for health care that has implications for their competitiveness. One of
them is the presence of asymmetric information. The care giver generally knows a
lot more than the patient about his or her diagnosis and potential therapies. In fact
Arrow (1963) argues that the physician can be viewed as primarily selling information
that reduces the patient’s uncertainty. In addition, the patient cannot perfectly

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observe the quality of the care even after it has been consumed. This in turn implies that patients prefer one care giver over another based on real or perceived differences. Further, the services on these markets are differentiated. The implication for competition is that a care giver potentially can raise prices without losing all its patients to competing providers, that are selling similar, but not identical services (Drano v e and Satterthwaite, 2000). The vertical and horizontal relations that occur due to the presence of asymmetric information are not unique to the market for health care. They could also occur on some service markets (e.g. auto repair shops) and on closer related markets such as the market for dental care, which is the focus of this paper.

It has been argued that dental care is different from general health care, primarily because of the nature of dental diseases; e.g. they are relatively few, less unpredictable and easier to diagnose. In addition, patients generally undergo the same dental procedure several times and thus would learn about the quality of the service (Sintonen and Linosmaa, 2000). However the market for dental services clearly shares features with the market for health care services, which makes it plausible to analyze competition on these markets analogously. As with health care, patients in a sense buy information from their dentist about diagnosis and appropriate treatments. Apart from the presence of asymmetric information, there are also for example search costs on both markets and the patient cannot, even after shopping around, be confident that the chosen care giver is the best match.

Understanding the structure and conduct of markets with information asymmetries is clearly interesting from a public finance perspective. Especially as all OECD countries are struggling with how to organize the health care system in order to deal with the aging population and the rise in expenditures on health services. This paper adds to the literature by focusing on the relation between market structure and price setting for services that differ in their degree of information asymmetry between the patient and the care giver. The focus in this paper is thus on different kinds of care services, whereas a large part of the earlier literature is focused on the relation between (mainly) hospital concentration and hospital prices in general (Gaynor and Town, 2011). A major advantage with the paper compared to earlier literature is the data. By using administrative registers almost all dental care consumed in Sweden during July 2008- June 2011 is covered. Clinic records are linked to population registers and geographical variables, with information on clinics’ coordinates and patients’ residential area. The geographical variables allows for a more dynamic definition of markets than e.g. using geopolitical boundaries, which is an innovation over the existing literature. Another shortcoming in the existing literature is price measures. Many of the studies on competition use data from the US,
where prices generally depends on complicated hospital-insurer contracts (Gaynor and Town, 2011). There are no such contracts on the Swedish dental care market and the register data used in this paper contains information on the charged prices for all treatments.

2 Institutional setting

The Swedish dental care system was reformed through the introduction of the Dental Care Benefit in 2008. The reform was motivated by concerns about increasing prices for dental care and the main purpose with the reform was to make dental care more affordable, especially for those in great need. To this aim a dental care allowance and a high cost protection plan was introduced. The Dental Care Benefit applies to all citizens aged 20 and over, and both private and public clinics are subscribed to the system. The majority of clinics (60-80 %) in Sweden are private and this did not change after the reform. Patients can freely choose a dentist and can for example use their dental care allowance to pay for a treatment at a private clinic. The allowance is SEK 300 per year (about $ 40) for individuals aged 20-29 and 75 years or older, and SEK 300 per year for those aged 30-74. Price setting is not regulated.

3 Data

The data come from the Dental Care Register at The Swedish Social Insurance Agency linked to administrative registers and geographical variables collected at Statistics Sweden. The Dental Care Register covers all dental care produced at clinics that are subscribed with the dental care benefit system, which is approximately 96 % of all clinics. It contains diagnosis, treatment, visits and price among other variables. The Dental Care Register covers over 47 million treatments during the studied period. The administrative register data used in this paper covers all individuals above 19 years old. It contains annual information of income sources and various educational and demographic characteristics. The geographic variables contain information about the clinics’ location, defined as the midpoint of a 100 x 100 meter square around the clinics’ coordinates. For individuals the geographic variables contain the SAMS-area (Small Areas for Market Statistics) for their home and (if applicable) their work place. All data covers the period July 2008- June 2011.
4 Empirical strategy

The objective of this paper is to estimate the relation between prices for treatments and the number of competitors and how this relation differs with the type of treatment. The first step is to define treatments that differ in the degree of information asymmetry between the patient and the dentist. For example, treatments that differ in how frequently they are consumed and treatments that differ in their complexity. As stated above, a patient can learn about quality of a service if it is consumed several times, e.g. professional cleaning, whereas removing a wisdom tooth is something a patient does maybe once or twice in a lifetime. With the same type of argument it maybe easier for a patient to evaluate the quality of an uncomplicated filling, compared to evaluating the quality of dental implant surgery.

The second step is to delineate the relevant market and construct a measure of competition. As mentioned above, the rich data will be utilized to define markets in a dynamic way. Instead of defining a geographical area as a market, the number of surrounding clinics within a certain distance is computed for each clinic. The distance may be weighted by the propensity to commute among individuals living and working in the area close to the the clinic. This would take into account if the population in an area is mobile and thus more likely to visit a dentist further away. The market that a clinic belongs to can be viewed as the clinic itself and the network of surrounding clinics, within a certain distance.

The treatments that are being compared as described above, e.g. treatments consumed frequently versus infrequently, are denoted 1 and 0. The baseline model compares price differences between treatments 1 and 0 across clinics that differ with respect to their competitive environment. It can thus be thought of as a difference-in-differences approach. The baseline model has the following specification:

\[ p_{jki} = \alpha + c_{ji} + \delta_1 I_i(k = 0) + \delta_2 I_i(k = 0) c_{ji} + \varepsilon_{jki} \]

where \( p_{jki} \) is the mean price of treatment \( k \) at clinic \( j \), payed by individual \( i \). Variable \( c \) captures competition, \( I \) is an indicator for the type of treatment and \( \delta_1 \) captures the mean difference in price between treatments 1 and 0. The parameter of interest is \( \delta_2 \), capturing the price difference interacted with competition. Given that \( k = 0 \) is a type of treatment with a smaller degree of asymmetric information compared to 1, \( \delta_2 \) is assumed to be negative. This reflects that \( k = 0 \) potentially is a competitive type of treatment and on markets with more competition there will therefore be a greater price difference between treatments 0 and 1 on average.

The model is specified on the individual level, however it will be estimated with clinics as the unit of analysis, since nothing is gained by estimating it at the individ-
ual level. In general, patients will buy treatment 0 or 1, and therefore it will not be possible to account for individual fixed effects. With data aggregated on the clinic level, the second term $c_{ji}$ becomes $c_j$, capturing clinic fixed effects. This model can be estimated with OLS, where clinics are weighted with their number of patients.

5 Extensions

The analysis may (and will) be extended in several ways by elaborating on the measure of competition. In its simplest form, competition is captured by the number of surrounding clinics in every clinics' "network", as described above. With this approach it is possible to take patients mobility into account when defining the size of the markets. It is also possible to calculate market shares for each clinic within a network. Another extension is to study the interaction between the private and public clinics.

Another possible extension is to elaborate on the error structure by incorporating a spatial autoregressive process. In such a spatial error model, $\varepsilon_{jk}$ would depend on the error term of the other clinics on clinic $j$'s market.

6 Results

To be added.

7 Conclusions

To be added.

References


