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Second-degree price discrimination by Japanese newspapers

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ABSTRACT

In Japan, the newspaper publishers with the greatest daily circulation offer both morning and evening editions in most of their distribution areas, and many of them allow their customers to choose between morning-only and morning-and-evening subscriptions. Each such newspaper publisher, in setting the subscription prices and numbers of pages of content in its morning edition and evening edition, must take into account self-selection of demanders as to type of subscription. The subscription offerings thus amount to second-degree price discrimination, which is the main reason why it might be profitable to even publish an evening edition along with the morning one. Estimates here show that the Japanese newspaper publishers that do offer optional evening editions enlarge their profits by around eight percent of their morning-edition subscription revenue. Furthermore, these newspaper publishers increase consumer surplus by an amount equal to half what they add their own profit. The second-degree price discrimination increases social welfare.

1. Introduction

The main contributions here are the following. First is a new method of estimating demand for newspaper subscriptions from aggregate data on subscription prices and pages of content of evening editions and morning editions, using nonlinear least squares. Estimates of demand parameters for Japanese newspapers using this method with aggregate data resemble estimates for those same newspapers based on multinomial logit specification with control function and using micro-data in Flath (2016). The new method is valuable because it could perhaps be implemented in cases where the data do not support other methods of demand estimation. The second contribution is an economic model of profit-maximizing subscription prices and pages of content for a newspaper if offering its subscribers a choice between morning-only subscription and morning-and-evening subscription, or if offering only morning subscriptions. It is the same model that underlies the new estimating method, but it has some value itself as a simple theoretical framework for thinking about second-degree price discrimination in an oligopoly, even if its parameters could not be estimated. Third are the actual estimates and their interpretation: Japanese newspapers that offer their subscribers a choice between morning-only and morning-and-evening subscriptions enlarge their profit by about eight percent of their morning edition subscription revenue, compared to the case if offering only morning edition, and increase the consumers' surplus by about half the increase in their own profit. The three contributions together amount to a novel and tractable model for empirical analysis of second-degree price discrimination in an oligopoly. The model is applied to Japanese newspapers but could be extended to other cases of oligopolistic second-degree price discrimination such as the setting of classes of air fares. Welfare analysis of price discrimination requires such empirical modelling. The finding that second-degree price discrimination by Japanese newspapers is both profitable and enlarges consumer surplus is a useful caution against antitrust rules that might be concocted to prohibit such price discrimination. The model could also be used as a tool for management decision-making by Japanese newspapers, to set prices and amount of content that profitably track changes in demand and costs.

In Japan, the newspaper publishers with the greatest daily circulation offer both morning and evening editions in most of their distribution areas. The national dailies (Yomiuri, Asahi, Mainichi, and Sankei) all do so and the bloc newspapers (Chunichi, Chugoku and Hokkaido Shimbun) do as well. Typically, these offer subscribers a choice between subscribing to the morning edition only, or subscribing to both morning and evening edition. In some locales away from urban centers, the national newspapers are only offered as morning editions. And a number of regional newspapers with smaller circulation (To-o Nippo, Oita Godo, Iwate Nippo, Yamagata Shimbun, Ryukyu Shimpo) offer both morning and evening editions together, but with no option of subscribing to the morning edition only. Shizuoka Shimbun purports to offer

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subscribers a choice between morning and evening editions or just evening edition, but almost none opt for just the evening edition.

Each newspaper publisher that offers subscribers a choice between morning edition and morning-plus-evening edition, in setting its subscription prices and numbers of pages of content, knowingly influences the self-selection of demanders as to type of subscription. Though seldom remarked, the pricing and quality of morning-only subscriptions and morning-and-evening subscriptions to the same newspaper is an instance of Pigouvian second-degree price discrimination. Other examples of such pricing abound. Transport fares offered in differing quality classes, beverage prices that differ per unit depending on the size of container, prices of electricity that vary depending on monthly number of kilowatts used, and so on, are obvious examples.

A newspaper publisher that offers its morning subscribers an option to also subscribe to an evening edition will do so with an eye to attracting more low-valuing customers without sacrificing the profit it earns by servicing its higher valuing customers. The publisher would shift content pages from the morning edition to its newly offered evening edition, and at the same time lower the price of a morning-only subscription compared to the price it had set when not offering an evening edition. Whether the self-selection by demanders that this behavior induces can be profitable for the publisher depends on the demand it faces. For instance, if all demanders were identical, then it would not be profitable (as second-degree price discrimination) to offer morning subscribers the option of also subscribing to an evening edition. But subscribers are not identical to one another. Estimates here show that the Japanese newspaper publishers that do offer optional evening editions enlarge their profits by around eight percent of their morning-edition subscription revenue. Furthermore, these newspaper publishers increase consumer surplus by an amount equal to half what they add to their own profit. The second-degree price discrimination increases social welfare. All of this requires a general framework for thinking about newspaper pricing that takes into account that newspapers are platforms in two-sided markets. Newspaper publishers sell both subscriptions and advertising, and the demand for advertising depends on the number of subscribers.

The new estimates on which my analysis partly rests exploits the variation in pricing and circulation of the differing editions offered by same newspaper publishers, to identify parameters of the demand for newspaper content. I estimate these parameters using nonlinear least squares and find that price elasticity of demand is less than *2* and elasticity of demand with respect to pages of content is less than *1*. Producing these estimates solves a difficult problem in that many of the newspaper publishers set exactly the same prices as one another. With virtually no cross-section (or temporal) variation in prices it is still possible to infer price elasticity of demand based on an assumed relationship between individuals' valuations of pages of content and their valuations of subscriptions. Furthermore, this new method of estimating elasticities of demand for newspaper subscriptions offers a useful cross-check of estimates based on multinomial logit specification of an indirect utility function.

This paper contributes to the empirical literature on second-degree price discrimination. It also contributes to the econometric analysis of platforms in two-sided markets, newspapers in particular. In a study that occupies a similar niche to this one, Angelucci et al. (2013) have identified the difference between subscription price and kiosk price of French newspapers as an example of second-degree price discrimination. They show empirically that following the 1968 introduction of television advertising in France the national newspapers reduced the difference between their subscription prices and kiosk prices, that is, reduced their price discrimination. Other empirical studies of second-degree price discrimination, that is to say, price discrimination relying on self-selection of demanders when presented with a pricing schedule, include Cohen (2008) for paper towels, Busse and Rysman (2005) for yellow pages advertising, McManus (2007) for coffee drinks, and Shum and Crawford (2007) for cable television subscriptions. Other econometric analyses of newspaper pricing, not focused on price discrimination, include Argentesi and Filistrucchi (2007) for Italy, Van Cayseele and Vanormelingen (2009) for Belgium, and Fan (2013) for the United States.

A novel contribution here is an original, partial-equilibrium model of the demands for morning edition and evening edition subscriptions offered by the same newspaper publisher. This model is used in determining how a newspaper publisher's offering its morning subscribers the option of also subscribing to an evening edition affects its subscription prices, pages of content in each edition, and profit, and how it affects consumer surplus. This leads to the main empirical finding of this paper, already mentioned, that Japanese newspaper publishers who do offer evening editions enlarge their profits and also increase consumer surplus.

The inferences in this paper presume that the choice of each newspaper publisher takes as given the prices and contents of rival newspaper publishers. I will not address the strategic interdependence among the choices of the various newspaper companies, for example, how one newspaper publisher offering an evening edition affects whether rival newspaper publishers would do so. Furthermore, in the framework of this paper, I will assume that demanders regard the content pages of any one newspaper publisher as homogeneous, but that each demander does differentiate among the pages offered by different publishers. This is a novel and tractable way of modelling second-degree price discrimination in an oligopoly, and may be applicable to industries other than newspaper publishing, for example airlines.

2. Basic framework

I begin by describing the pricing and content choices of a single-edition newspaper, one that is offered in morning edition only, taking as given the prices and contents of rival newspapers. Potential subscribers to the newspapers are households. I will presume that each household subscribes to at most one newspaper—either morning-only or morning-and-evening. Each element of the household choice set is either: (i) a combined subscription to both morning-and-evening editions of the same newspaper, (ii) a subscription to the morning-edition-only of a newspaper, or (iii) no subscription to any newspaper. This matches the facts of the Japanese newspaper industry fairly closely. Based on the March 2007 random-direct-dial telephone survey of 26,490 persons living throughout Japan conducted by Video Research, Ltd. (the 2007 edition of its annual JREAD survey), virtually all who subscribe to an evening edition also subscribe to the morning edition of the same newspaper. And more than 95 percent of the respondents subscribed to only one ordinary newspaper or none (I exclude from this the Nikkei Shimbun, which is a business daily, similar to the Wall Street journal—most of its subscribers also subscribe to an ordinary newspaper).

Thus, each household has its own ***discrete*** next-best alternative to subscribing to any one particular single-edition newspaper. Each household's reservation price of subscribing to the one particular newspaper edition is the highest price at which it would subscribe to that one and forego its next most-preferred alternative. In the model of this paper, the next-best alternative of each subscriber to morning-and-evening edition will turn out to be a morning-only subscription to the same newspaper, and the next-best alternative of each morning-only subscriber will be either a morning-only subscription to a different newspaper or no subscription. More general substitution patterns can be imagined, but this pattern follows from the primitive assumptions about preferences of my model. More about this in due course.

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