Measuring the Brand Value of Media Platforms

in an Equilibrium Framework

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Abstract

This study presents a framework for measuring the brand values of media platforms, and applies it to the data of Japanese women's magazines between 2004 and 2010. Brand value of each platform is defined as the difference between the equilibrium profit produced by the platform operator under the status quo and the profit if the platform were unbranded. In the framework, the influences of competition among operators and the interactions between readers and advertisers on operators' profits are considered explicitly. The results show that the total brand value, i.e., the sum of reader and advertiser sides, decreased during this period. Although the brand value on the reader side largely accounts for the total brand value, the brand value on the advertiser side was smaller in magnitude. In addition, while the brand value on the reader side bounced back after falling from 2004 to 2007, the brand value on the advertiser side continued to decline throughout the period. The decomposition of the category-level brand value shows that the reallocation of circulation from magazines with high brand value to those with low brand value, which was accompanied by downward trends of average brand values, resulted in the decline of the category-level brand value.

JEL classifications: L11; L13; L82; M31.

Keywords: branding; brand equity measurement; platform competition.

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1 Introduction

Pearson, a London-based global education and publishing company, sold *The Financial Times*, an influential business media publication, to the Nikkei Group, a Japanese media conglomerate, for 1.3B USD (Somaiya et al. 2015 [34]) in 2015. The deal attracted public attention because of the eye-opening amount paid by Nikkei relative to other media deals and it spurred a debate about the appropriateness and rationality of the deal.[1] In its press release, Nikkei announced that by integrating the prestigious brand of *The Financial Times* with its human resources and knowledge, Nikkei will advance its global and digital growth strategy with the aim to be a global economic media player (Nikkei 2015 [26]). Keller and Lehmann (2006) [19] argued that brands are one of the most important productive assets for firms in the business and financial sense as machinery and buildings. Thus, it is crucial to assess and understand the value of branding for important managerial decision-making in media business (e.g., mergers and acquisitions or divestment).

This study presents a hybrid framework for quantifying the brand values of media platforms who typically match advertisers with audiences (e.g., magazines, newspapers, radio, and television), by integrating Goldfarb et al. (2009) [17] and the empirical studies of two-sided media platforms.[2] In the framework, the brand value of each platform is measured as the difference between the equilibrium profit produced by the operator of a platform under the status quo and what they would have earned if the platform were unbranded. Therefore, this study constructs an oligopolistic market model for media platforms in which the indirect network effects between audiences and advertisers are incorporated explicitly. More concretely, in our model, the advertisers' demand for advertisements on a platform is affected by its audience size and the audiences' demand for the platform is affected by the amount of advertising on the platform. A counterfactual situation where each platform lost its brand equity is then simulated based on the market model and the platform's brand value is estimated as the difference between the operator's actual profit and its simulated equilibrium profit.

As in Goldfarb et al. (2009) [17], the brand value estimates of this study reflect the revealed actual choice behaviors of platform operators, audiences, and advertisers because the framework deploys

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[1]Pearson sold its stake in The Economist Group to other shareholders for 469M GBP in 2015 (Sweney 2015 [38]). According to Somaiya et al. (2015) [34], *The Washington Post* was sold for 250M USD, and *The Boston Globe* (and affiliated assets) was sold for 70M USD in 2013. Saba (2015) [33] reports that Nikkei's payment was 35 times *The Financial Times*'s adjusted operating income in 2014 (37M USD), and the multiple was about twice as large as the purchase of *The Washington Post* by Mr. Jeff Bezos, chief executive of Amazon. While Kobayashi (2016) [22] reported experts' positive views on Nikke's acquisition of *The Financial Times*, Matsuda (2015) [23] argued that Nikkei required a large synergy effect because of the merger to produce successful results in the future.

[2]Empirical studies of two-sided media platforms include Argentesi and Filistrucchi (2007) [1] for Italian daily newspapers, Filistrucchi et al. (2010, 2012) [13, 14] for the Dutch daily newspapers, Flath (2016, 2017) [15, 16] for the Japanese newspapers, Kaiser and Song (2009) [20] and Kaiser and Wright (2006) [21] for the German magazines, Ohashi and Sunada (2013) [28] for the Japanese magazines, Rysman (2004) [32] for the US yellow pages, and Wilbur (2008) [39] for US television broadcasting. Empirical studies have also examined two-sided markets other than media platforms: e.g., Clements and Ohashi (2005) [8] and Corts and Lederman (2009) [9] for US video games, Nair et al. (2004) [25] for US personal digital assistants. Armstrong (2006) [2] and Rochet and Tirole (2008) [31] explored the theoretical basis of two-sided markets.

observational data instead of survey data. In brand value estimation, while the framework enables us to estimate brand equity separately from other factors, such as prices and product characteristics, it also explicitly considers the influence of competition among operators and the interactions (i.e., indirect network effects) between audiences and advertisers on the operator's profit. Moreover, the framework allows to separately estimate the brand values from the audience and advertiser sides, as well as the total brand value (the sum of the audience and advertiser sides). The results are consistent with the market model.

To the author's knowledge, this is the first challenge to extend Goldfarb et al. (2009) [17] to two-sided media platforms and apply the framework to real-world data. Some studies have extended and applied the framework of Goldfarb et al. (2009) [17] to various contexts.[3] Chu (2013) [7] utilized the framework to quantify nation equity, i.e., the product's equity associated with its country of origin, in the Chinese personal computer market from 1995 to 2008 and found an effect on firms' marketing power. Borkovsky et al. (2017) [6] extended a static framework to a dynamic environment where the brand value is defined as the expected net present value of future cash flow produced for a firm by its brand, and estimated the brand values of the stacked chips between 2001 and 2006. A research closely related to our study is Sun (2012) [37], who estimated the brand values of three major operating system platforms, i.e., iPhone, BlackBerry, and Android, in the US smartphone market from 2007 to 2009, which is an example of "demand-coordinator" (Evans 2003 [11]), by incorporating the empirical model of two-sided platform of Nair et al. (2004) [25]. Thus, Sun (2012) [37] and this study can be seen as different extensions of Goldfarb et al. (2009) [17] for two-sided platforms.

For an illustrative purpose, the framework was applied to the Japanese women's magazine market. The brand value measurement in the context of magazine market proceeds as follows: first, the reader (audience) and advertiser demand functions are estimated using the data of Japanese women's magazines between 2004 and 2010. Next, the marginal costs are recovered based on the estimated demand parameters and the equilibrium first-order conditions with the assumption of Bertrand-type pricing game on both sides of the market. Then, based on the market model, the author simulate the equilibrium profit of the publisher of a magazine in a hypothetical situation where its brand equity were lost, and measure the brand value as a difference between the publisher's actual and simulated profits.

The empirical results are summarized as follows. The estimation results of demand functions on both sides of the market reveal the positive feedback between readers and advertisers: i.e., advertisers prefer magazines with a large audience and readers appreciate advertising in magazines. On the one

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[3]Ferjani, et al. (2009) [12] proposed a similar measurement framework for consumer- and firm-level brand valuation with choice-based conjoint methodology. Yang et al. (2009) [40] employed another type of structural approach for brand value assessment. They investigated the brand alliances in the National Basketball Association by estimating a structural two-sided matching model and found that an alliance between high brand equity players and medium brand equity teams resulted in the highest brand value.

hand, according to the brand value measurement results, the estimated total brand value, i.e., the sum of reader and advertiser sides, decreased on average during this period. On the other hand, the estimate of brand value on each side of the market shows a different picture. Although the brand value on the reader side accounted for a large part of the total brand value, that on the advertiser side was smaller in magnitude. Moreover, while the brand value on the reader side resurged after a fall from 2004 to 2007, that on the advertiser side continued to decrease throughout the period. The author then performs the decomposition of the category-level brand value, which is measured as a weighted average of each magazine's brand value with their shares of circulation as weights. The result shows that the reallocation of circulation from magazines with high brand value to those with low brand value, accompanied by the downward trend of average brand value, resulted in the decline of the category-level brand value. In addition, while the reader side demonstrated a similar pattern to the total, magazines with a low brand value on the advertiser side had a large circulation share and the negative correlation between brand value on the advertiser side and circulation became more significant during this period.

The remainder of this study is organized as follows. The next section presents the measurement framework for media platforms' brand values based on a model of oligopolistic competition in a two-sided market. Section 3 explains the empirical issues of its application to the Japanese women's magazine market, i.e., the data and demand specifications on the reader and advertiser sides. Section 4 reports and discusses the estimation results. Finally, Section 5 concludes.

2 Framework

2.1 Model

The measurement framework for media platforms' brand values in this study is an extension of Goldfarb et al. (2009) [17], by incorporating an empirical framework of media platforms. Following Goldfarb et al. (2009) [17], "brand equity" in this study indicates what the brand provides to customers, i.e., audiences and advertisers, and "brand value" is what the brand does to the operators or firms.

In this section, the framework is explained in the context of magazine market for a clarity of exposition and a consistency with its application in the following sections. Thus, media platforms are magazines, audiences are readers, and firms are publishers, respectively. Consider a market in which there are J_t magazines, which are published by F_t publishers in year t, and the profit of publisher f, who publishes J_{ft} magazines among J_t, is defined as follows:

$$\Pi_{ft}(b^x, b^a) \quad = \quad \sum_{j \in J_{ft}} [(p_{jt} - c_{jt}^x) x_{jt}(p_t, a_t, b^x) + (q_{jt} - c_{jt}^a) a_{jt}(q_t, x_t, b^a)], \tag{1}$$

where x_{jt} is circulation (i.e., the demand on the reader side), p_{jt} is cover price, a_{jt} is advertisement pages (i.e., the demand on the advertiser side), q_{jt} is advertising price, c_{jt}^x is the marginal cost acquired on the reader side, and c_{jt}^a is the marginal cost acquired on the advertiser side. On the one hand, x_t, p_t, a_t, q_t, c_t^x, and c_t^a represent the vectors of their corresponding variables for all magazines in year t: e.g., $x_t = (x_{1t}, \cdots, x_{J_t t})$. On the other hand, b^x and b^a are the vectors of brand equity of each magazine on the reader (b_j^x) and advertiser sides (b_j^a), respectively ($j = 1, \cdots, J_t$).

In this framework, it is assumed that publishers play a pricing game on each side of the market and simultaneously choose cover and advertising prices for their magazines to maximize their profit (1). Therefore, the following first-order conditions for cover price can be obtained:

$$x_{jt} + \sum_{k \in J_{ft}} (p_{kt} - c_{kt}^x) \frac{\partial x_{kt}}{\partial p_{jt}} + \sum_{k \in J_{ft}} (q_{kt} - c_{kt}^a) \frac{\partial a_{kt}}{\partial p_{jt}} = 0,$$

and, for advertising price:

$$\sum_{k \in J_{ft}} (p_{kt} - c_{kt}^x) \frac{\partial x_{kt}}{\partial q_{jt}} + a_{jt} + \sum_{k \in J_{ft}} (q_{kt} - c_{kt}^a) \frac{\partial a_{kt}}{\partial q_{jt}} = 0,$$

of magazine j. These first-order conditions can be solved for the margin on both sides of the market in a matrix form:

$$\begin{pmatrix} p_t - c_t^x \\ q_t - c_t^a \end{pmatrix} = - \left[\begin{pmatrix} D_t^{xp} & D_t^{ap} \\ D_t^{xq} & D_t^{aq} \end{pmatrix} \odot \begin{pmatrix} I_t & I_t \\ I_t & I_t \end{pmatrix} \right]^{-1} \begin{pmatrix} x_t \\ a_t \end{pmatrix} \tag{2}$$

where the operator $\odot$ denotes the element-by-element multiplication of two matrices. I_t is an ownership matrix: i.e., its (j, k) element, I_{jkt} is one if magazine j and k are owned by the same publisher, otherwise zero. The matrix of marginal effects of endogenous variables (i.e., circulation, cover price, advertisements, and advertising price) are defined as follows:

$$\begin{pmatrix} D_t^{xp} & D_t^{ap} \\ D_t^{xq} & D_t^{aq} \end{pmatrix} = - \begin{pmatrix} \Delta_t & O \\ O & \Omega_t \end{pmatrix} \begin{pmatrix} -E & B_t \\ \Gamma_t & -E \end{pmatrix}^{-1} \tag{3}$$

where E is an identity matrix and O is a null matrix, $\Delta_{jkt} = \partial x_{kt}/\partial p_{jt}$, $\Omega_{jkt} = \partial a_{kt}/\partial q_{jt}$, $B_{jkt} = \partial a_{kt}/\partial x_{jt}$, and $\Gamma_{jkt} = \partial x_{kt}/\partial a_{jt}$. Therefore, using (2) and (3), we can estimate the marginal costs on both sides of the market, i.e., the key factors in our framework, with the estimated demand parameters.

2.2 Brand Value Measure

One of the novel features of Goldfarb et al. (2009) [17] is their definition of brand value as the equilibrium profit earned by a brand in its state minus the profit it would have earned if the platform were

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unbranded. This study basically follows their definitions. Suppose the estimation of the brand value of magazine l published by publisher f in year t. The first factor in brand value calculation is the profit of publisher f is the status quo, i.e., the profit function (1) evaluated at the observed prices (p_t and q_t), estimated marginal costs ($\hat{c}_t^x$ and $\hat{c}_t^a$), and brand equities ($\hat{b}^x$ and $\hat{b}^a$), on both sides of the market, as follows:

$$\Pi_{ft}(\hat{b}^x, \hat{b}^a) = \pi_{ft}^x(p_t, q_t \mid \hat{c}_t^x, \hat{c}_t^a, \hat{b}^x, \hat{b}^a) + \pi_{ft}^a(p_t, q_t \mid \hat{c}_t^x, \hat{c}_t^a, \hat{b}^x, \hat{b}^a), \tag{4}$$

where

$$\pi_{ft}^x(p_t, q_t \mid \hat{c}_t^x, \hat{c}_t^a, \hat{b}^x, \hat{b}^a) = \sum_{j \in J_{ft}} (p_{jt} - \hat{c}_{jt}^x) x_{jt}(p_t, a_t, \hat{b}^x),$$

and

$$\pi_{ft}^a(p_t, q_t \mid \hat{c}_t^x, \hat{c}_t^a, \hat{b}^x, \hat{b}^a) = \sum_{j \in J_{ft}} (q_{jt} - \hat{c}_{jt}^a) a_{jt}(q_t, x_t, \hat{b}^a),$$

respectively.

The second factor in brand value measurement is the profit of publisher f in a "but-for" world, where magazine l lost its brand name. In such a counterfactual situation, it is assumed that magazine l lost its brand equities on both sides of the market while other magazines retained their brand equities. The following new brand equity vectors represent the situation:

$$\hat{b}_{-l}^x = (\hat{b}_1^x, ..., \hat{b}_{l-1}^x, 0, \hat{b}_{l+1}^x, ..., \hat{b}_{J_t}^x), \tag{5}$$

and

$$\hat{b}_{-l}^a = (\hat{b}_1^a, ..., \hat{b}_{l-1}^a, 0, \hat{b}_{l+1}^a, ..., \hat{b}_{J_t}^a), \tag{6}$$

where the estimates of brand equities for magazine l is changed to zero ($\hat{b}_l^x = 0$ and $\hat{b}_l^a = 0$). As a response to this change in magazine l's brand equities, all publishers including f may adjust the prices of their magazines on both sides of the market. The new equilibrium prices, p_t' and q_t', are a solution of (2) and (3) with the new brand equity vectors (5) and (6). To solve the first-order conditions for new equilibrium prices, we utilize the following algorithm: until the outer loop reaches the prices that satisfy the first-order conditions under the new market environment, the inner loop searches for demand quantities that satisfy the demand equations on both sides of the market simultaneously for the given prices.

As explained below, the demands on both sides of the market are specified in a discrete choice model, and, at each step of the outer search, we solve the following fixed-point problem for the given price vectors with simple successive approximation as the estimation of entry-game with incomplete

information in Ellickson and Misra (2011) [10]:

$$s_{jt}^{x*} = x_{jt}^*/M_t^x = F^x(p_t, s_t^{a*}M_t^a \mid \hat{b}_{-l}^x),$$

and

$$s_{jt}^{a*} = a_{jt}^*/M_t^a = F^a(q_t, s_t^{x*}M_t^x \mid \hat{b}_{-l}^a).$$

where s_{jt}^{x*} is the readers' choice probability (or market share) of magazine j, s_{jt}^{x*} is the advertisers' choice probability of magazine j, M_t^x is the potential market size on the reader side, M_t^a is the potential market size on the advertiser side, and "$*$" stands for values at a solution.[4]

As is the case with the status quo, the counterfactual equilibrium profit of publisher f should be evaluated at new prices, marginal costs, and new brand equity vectors, as follows:

$$\Pi_{ft}(\hat{b}_{-l}^x, \hat{b}_{-l}^a) = \pi_{ft}^x(p_t', q_t' \mid \hat{c}_t^x, \hat{c}_t^a, \hat{b}_{-l}^x, \hat{b}_{-l}^a) + \pi_{ft}^a(p_t', q_t' \mid \hat{c}_t^x, \hat{c}_t^a, \hat{b}_{-l}^x, \hat{b}_{-l}^a). \tag{7}$$

Therefore, the brand value of magazine l for publisher f is calculated as the difference between f's actual (4) and counterfactual profits (7):

$$\begin{aligned}
\phi_{flt} &= \Pi_{ft}(\hat{b}^x, \hat{b}^a) - \Pi_{ft}(\hat{b}_{-l}^x, \hat{b}_{-l}^a), \\
&= [\pi_{ft}^x(\hat{b}^x, \hat{b}^a) - \pi_{ft}^x(\hat{b}_{-l}^x, \hat{b}_{-l}^a)] + [\pi_{ft}^a(\hat{b}^x, \hat{b}^a) - \pi_{ft}^a(\hat{b}_{-l}^x, \hat{b}_{-l}^a)], \\
&= \phi_{flt}^x + \phi_{flt}^a. \tag{8}
\end{aligned}$$

In addition, as in (8), the total brand value (ϕ_{flt}) is just the sum of the brand values on the reader (ϕ_{flt}^x) and advertiser sides (ϕ_{flt}^a). Figure 1 provides an overview of our measurement framework.

= Figure 1 =

While our framework is a simple extension of Goldfarb et al. (2009) [17] to two-sided media platforms, there is a difference in brand equity estimation. In Goldfarb et al. (2009) [17] , after the demand estimation of the US breakfast cereal market, they regressed the fixed-effect estimates of subbrands (e.g., Wheaties) from the first-stage regression on four brand dummy variables (e.g., General Mills) as well as the observed time-invariant cereal characteristics. They then defined the estimated coefficient of brand dummy as "brand equity," and the residual as "subbrand equity," respectively. On the other hand, as explained below, this study simply defines the estimated magazine fixed effects in the demand estimations as the magazine's brand equity on each side of the market. Therefore, our mea-

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[4]We solve the problem with the observed demand quantities as an initial point and do not exhaustively look for all possible fixed points. Sriram et al. (2015) [36] noted that the issue of multiple equilibria is a fertile area in the two-sided market research and Song (2015) [35] used the fixed-point homotopy method for the inner loop search in merger simulations of German TV magazines.

sure of the magazine's brand equity can be considered as the sum of brand (publisher) and subbrand (magazine) equities in their contexts.[5]

3 Empirical Issues

3.1 Japanese Women's Magazines in the 2000s

In the remainder of this study, the author will employ our framework on the data of Japanese women's magazines between 2004 and 2010. This subsection briefly reviews the magazine category in Japan.

On the reader side, Figure 2 depicts the circulation trends for women's magazines and their share of the total magazine circulation during the 2000s.[6] On the one hand, the circulation of women's magazines declined from 401.39 million copies in 2000 to 321.13 million in 2010. On the other hand, its share of the total magazine circulation gradually increased from 8.71% in 2000 to 9.90% in 2010 because the total circulation decreased more dramatically than did the circulation in the women's magazine category, from 4.62 billion copies in 2000 to 3.24 billion in 2010 (RIP [30]).

The situation for the advertisers' side of women's magazines during the same period is shown in Figure 3, which shows that advertisement pages in women's magazines decreased from 116.98 thousand pages in 2000 to 89.42 thousand pages in 2010.[7] Apart from the fall in the share of women's magazines for total magazine advertisement pages between 2000 and 2001, the share surged from 35.33% in 2001 to 46.71% in 2010 because the total number of advertisement pages declined from 353.81 thousand pages in 2001 to 191.46 thousand pages in 2010, similarly to the decline in the reader side of the magazine market (RIP [30]).

In summary, the Japanese women's magazine category showed downward trends in both circulation and advertising, but it performed better than the total market throughout the 2000s. In addition, while its share in the total circulation was lower than 10%, advertising in women's magazines contributed to more than one third of the total magazine advertisement pages and reached about half in 2010 (NARI [27]).

3.2 Data

To recover the demand functions for both sides of the market and quantify brand values with the above-mentioned measurement framework, the yearly panel data of the Japanese women's maga-

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[5]In this study, all observable magazine characteristics are included in the demand estimations.

[6]This figure was based on data from the Research Institute for Publications (RIP) [30].

[7]This figure was based on data from the Nikkei Advertising Research Institute (NARI) [27]. The number of surveyed items (magazine titles) by NARI [27] fluctuated from year-to-year from 283 (2000) to 374 (2005) for the total market, and from 95 (2000) to 125 (2010) for women's magazines. The advertisement pages per item decreased between 2000 and 2010, i.e., from 1058 to 519 for the total market, and from 1231 to 715 for women's magazines. Therefore, the ratio of women's magazines to the total market increased from 1.16 in 2000 to 1.38 in 2010.

zines used in this study were constructed from several sources. The advertisement data—i.e., the advertisement volume (in pages) and revenue (in JPY) for each magazine from 2004 to 2010—were provided by MRS Advertising Research, Inc.[8] The average advertising price per page is computed by dividing the revenue by the volume, which is measured in 1,000 JPY.

The information about circulation (on average per issue, in copies), cover price (in JPY), magazine format (including whether it is irregular or not), publication frequency, year of first publication, genre classification, and publisher name were retrieved from the Japan Magazine Publishers Association (JMPA) [18].[9] The total pages (on average per issue) was collected from the corresponding editions of Media Research Center (MRC) [24]. As explained above, the brand equities of each magazine on both sides of the market are estimated as the fixed effects in demand estimations; therefore, we used magazines that were observed at least twice in the sample period with all information mentioned above. The sample size is 578.[10]

The magazine format was transformed into magazine size (mm^2) and the number of issues per year calculated based on the publication frequency.[11] The number of advertisement pages per issue, which is an output measure on the advertiser side, is computed by dividing the yearly advertisement volume by the number of issues per year. The number of content pages per issue is defined as the total pages minus the advertisement pages. The magazine age is computed as the difference between the year of observation and the year of first publication. The dummy variable for irregular-sided magazines (irregular size dummy) is one if the magazine format is irregular, otherwise zero. Finally, the cover and advertising prices are deflated by the Consumer Price Index (CPI, 2005 base).

3.3 Reader Demand

Readers are assumed to purchase one copy of the available magazines per year or to not purchase any magazine (outside option; $j = 0$). Reader i's indirect utility attained by purchasing a copy of magazine j within genre g ($g = 1, \cdots, G$) in year t is defined in the following nested logit equation:

$$v_{ijt}^x = \alpha \ln(p_{jt}) + \beta \ln(a_{jt}) + z_{jt}\gamma + b_j^x + \xi_{jt}^x + \zeta_{it|g}(\sigma) + (1 - \sigma)\epsilon_{ijt}^x, \tag{9}$$

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[8]MRS Advertising Research, Inc. is a marketing research firm specializing in print media and advertisements in Tokyo, Japan. According to its website (see http://www.mrs-ads.com/) (in Japanese only, March 26, 2018), they count advertisement pages and calculate the advertisement revenue based on the page counts and basic advertising price tables from *Zasshi Kokoku Keisai Ryokin Hyo (Magazine Advertising Rates)* published by the Japan Magazine Advertising Association (in Japanese).

[9]For more details, please refer to Appendix A. The publisher "Kadokawa" represents a group of publishers, Kadokawa Cross Media, Kadokawa Group Publishing, Kadokawa Magazines, Kadokawa Shoten, and Kadokawa SS Communications, while the publisher "Gakken" represents the Gakken Publishing and Gakushu Kenkyu Sha group. Two magazines (*Mainichi Ga Hakken* and *Waraku*) were excluded because they are only available by subscription fees for consecutive issues and not cover prices for a single issue.

[10]According to the RIP [30] and the NARI [27], the magazines in our sample account for 62.42% of the number of items, 82.94% of the total circulation, and 77.61% of the total advertisement pages in the women's magazine category in the Japanese magazine market during this period.

[11]For the details of magazine size and publication frequency (i.e., number of issues per year), please refer to Appendix A.

where p_{jt} is cover price, a_{jt} is the number of advertisement pages, z_{jt} is the observed magazine characteristics, i.e., (log of) content pages, magazine age, magazine size, irregular size dummy, and number of issues per year, b_j^x is the mean valuation of the unobserved characteristics of magazine j and measures j's brand equity on the reader side in this study. ξ_{jt}^x is a deviation from the mean valuation.[12] α, β, and γ are demand parameters. ϵ_{ijt}^x is an identically and independently distributed extreme value random variable, $\zeta_{it|g}$ is a random variable, which is common to all magazines in genre g, and conforms to a distribution function with parameter σ: $0 \leq \sigma < 1$.[13]

The utility of the outside option, i.e., reader i does not purchase a copy of any magazine, is defined as follows:

$$v_{i0t}^x = \delta_{0t}^x + \zeta_{it|0}(\sigma) + (1 - \sigma)\epsilon_{i0t}^x, \tag{10}$$

where δ_{0t}^x is the mean utility of the outside option and assumed to be zero.

Following Berry (1994) [3], a linear reader demand function is derived as follows:

$$\ln(s_{jt}^x) - \ln(s_{0t}^x) = \alpha \ln(p_{jt}) + \beta \ln(a_{jt}) + z_{jt}\gamma + \sigma \ln(s_{jt|g}^x) + b_j^x + \xi_{jt}^x, \tag{11}$$

where s_{jt}^x is the conventional market shares of magazine j calculated as $s_{jt}^x = x_{jt}/M_t^x$, where the potential market size on the reader side (M_t^x) is set to be equal to the Japanese female population. $s_{0t}^x \ (= 1 - \sum_j s_{jt}^x)$ is the market share of the outside option. $s_{jt|g}^x$ is the share of magazine j within genre g to which j belongs. b_j^x is estimated as the magazine fixed effect in the reader demand regression, and ξ_{jt}^x is an error term with the zero mean.

To identify demand parameters, we must deal with the three endogenous variables in (11) as determined within the market model: within-genre share, cover price, and advertisement pages. To control for the endogeneity problem, the five BLP-type instruments (Berry et al. 1995 [4]) were used for the observed characteristics of rival and own magazines: i.e., the number and the average content pages of all rival magazines, the average number of issues per year, the average age of rival magazines within the same genre, and the average number of issues per year of own magazines within the same genre. In addition, following Bonnet and Dubois (2010) [5], the four proxies of input costs are utilized as instruments: the Corporate Goods Price Index (CGPI) of printing paper, printing ink, and electric power, and the contractual cash earnings of printing and related industries (E15) in the Basic Survey on Wage Structure (BSWS).[14] These price indices and wages are interacted with magazine size, content

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[12]This study follows the demand estimation procedure of oligopolistic market of Berry (1994) [3], on both sides of the market.

[13]Magazines are classified into eight genres based on the classification of the JMPA [18]. The summary of genre distribution in our sample is reported in Appendix A.

[14]The CGPI is constructed and published by the Bank of Japan. We linked the series of 2000-, 2005-, and 2010-based indices for the three items. The BSWS is published by the Ministry of Health, Labour and Welfare, which uses the before-tax amount of cash wages paid to employees in measuring contractual cash earnings. All price and wage series are deflated by the CPI (2005 base).

pages, and the number of issues per year because the input quantities (and costs) of magazine depend on its size, pages, and publication frequency. The summary statistics for the regression variables are reported in Table 1.

= Table 1 =

3.4 Advertiser Demand

Advertisers are assumed to purchase one advertisement page from the available magazines for their promotional activities per year, or not purchase any magazine (outside option; $j = 0$). Advertiser k's indirect utility obtained by purchasing an advertisement page in magazine j in year t is defined in the following logit equation:

$$v_{jkt}^a = \eta \ln (q_{jt}) + \lambda \ln (x_{jt}) + z_{jt}\theta + b_j^a + \xi_{jt}^a + \epsilon_{jkt}^a \tag{12}$$

where q_{jt} is the advertising price, x_{jt} is circulation, z_{jt} is the observed magazine characteristics, which are the same as for the reader side, b_j^a is the mean valuation of the unobserved characteristics of magazine j and measures j's brand equity on the advertiser side in this study, and ξ_{jt}^a is the deviation from the mean valuation. η, λ, and θ are demand parameters. ϵ_{ijt}^a is an identically and independently distributed extreme value random variable.

The utility of the outside option, i.e., advertiser k does not purchase an advertisement page in any magazine, is defined as follows:

$$v_{0kt}^a = \delta_{0t}^a + \epsilon_{jkt}^a \tag{13}$$

where δ_{0t}^a is the mean utility of the outside option and assumed to be zero.

As is the case in the reader side, a linear advertiser demand function is derived as follows:

$$\ln (s_{jt}^a) - \ln (s_{0t}^a) = \eta \ln (q_{jt}) + \lambda \ln (x_{jt}) + z_{jt}\theta + b_j^a + \xi_{jt}^a, \tag{14}$$

where s_{jt}^a is the market share of magazine j calculated as $s_{jt}^a = a_{jt}/M_t^a$, where the potential market size on the advertiser side (M_t^a) is set equal to the total number of advertisement pages in all magazine categories in year t, which are collected from the Nikkei Advertising Research Institute (NARI) [27]. s_{0t}^a ($= 1 - \sum_j s_{jt}^a$) is the market share of the outside option on the advertiser side. b_j^a is estimated as the magazine fixed effect in the advertiser demand regression, and ξ_{jt}^a is an error term with the zero mean.

As in the reader side, to identify the demand parameters, we need instruments for the two endogenous variables, i.e., advertising price and circulation, in (14). Thus, four BLP-type instruments were used: i.e., number of all rival magazines, ratio of irregular-sized rival magazines within the same

genre, average number of issues per year of own magazines, and the average content pages of own magazines within the same genre. The summary statistics for the regression variables are reported in Table 1.

4 Results

4.1 Demand Estimates

Table 2 shows the estimation results for the reader demand function (11). The regression includes the magazine and year fixed effects, and the former results are discussed below. As expected, the estimated coefficient of (log of) within-genre share (σ) is statistically significant at the 1% level and falls in the range between zero and one. However, its magnitude is not so large and the readers' substitutability among magazines within the same genre are similar to that among magazines classified into different genres. The estimated coefficient of (log of) cover price is negative and statistically significant at the 1% level, thus it satisfies the theoretical requirement. For advertising pages, the estimate is positive and statistically significant at the 1% level. This result is almost the same as in Kaiser and Song (2009), i.e., on average, readers appreciate advertising in magazines.[15] For other controls, magazine age had a significantly positive effect (at the 1% level), and the irregular size dummy had a significantly negative effect (at the 5% level) on demand, respectively. The coefficient of (log of) contents page was positive, and those of magazine size and the number of issues per year (i.e., publication frequency) were negative, but all of them were not statistically significant. The Hansen J statistic of overidentification was 3.042 ($df = 6$): i.e., the endogeneity seems to be controlled well by our instruments.[16]

= Table 2 =

The estimation results for the advertiser demand function (14) are reported in Table 3. As is the case with the audience side, the regression also includes the magazine and year fixed effects. As expected from theory, the estimated coefficient of (log of) the advertising price is negative and statistically significant at the 1% level. The estimate of (log of) circulation is expectedly positive and statistically significant at the 5% level, which implies that advertisers prefer a magazine with a large audience.[17] For other controls, the (log of) content pages, magazine age, and the number of issues

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[15]Kaiser and Song (2009) reported that the estimated advertising elasticity on demand is 0.617 for women's segments in the German magazine market.

[16]For reference purposes, the OLS estimation result is also presented in Table 2 and the first-stage results are reported in Appendix B.

[17]This result is almost the same as the estimation results for advertiser demand in empirical studies of media markets (see Argentesi and Filistrucchi 2007 [1], Filistrucchi et al. 2010 [13], Kaiser and Song 2009 [20], Kaiser and Wright 2006 [21], Ohashi and Sunada 2013 [28], Rysman 2004 [32], Wilbur 2008 [39]).

per year (publication frequency) have negative effects on demand, with statistical significance at 1% for the first two but 10% for the last. The estimated coefficients of magazine size and irregular size dummy are positive, but not statistically significant. The Hansen J statistic of overidentification was 2.691 ($df = 2$): i.e., the endogeneity seems to be controlled well in this specification as the reader side.[18]

= Table 3 =

In the estimates of magazine fixed effects, i.e., brand equities on both sides of the market, this study specifies the magazine with the least fixed effect on each size of market as the baseline whose brand equity equals zero to obtain nonnegative brand equity estimates for all magazines. In this study, *Fujin No Tomo* and *Yoji To Hoiku* are on the reader and advertiser sides, respectively. According to the results, a difference was observed in the ranking of the magazine's estimated brand equity on each side of the market. The top five magazines on the reader side were: 1. *NHK Oshare Kobo* (37); 2. *Maple* (186); 3. *Hanajikan* (202); 4. *STORY* (87); and 5. *PINKY* (42). The top five magazines on the advertiser side were: 1. *Fujin Gaho* (101); 2. *Shufu No Tomo* (94); 3. *Katei Gaho* (92); 4. *Fujin Koron* (102); and 5. *25ans* (1).[19] The estimated brand equity on the reader and advertiser sides are negatively correlated: the correlation coefficient is -0.201. The author constructed the average ranking to look for magazines with relatively large brand equities on both sides of the market. The top five magazines were: 1. *with* (72); 2. *NHK Kyo No Ryori* (38); 3. *CanCam* (7), 4. *MORE* (34); and 5. *25ans* (1). The complete list of brand equity estimates for each magazine is presented in Appendix C.

4.2 Brand Value Estimates

This subsection reports the estimation results for magazines' brand values based on our framework in which the market is simulated for each magazine with its estimated brand equity changed to zero; i.e., the brand equity of the base magazine on the reader side (*Fujin No Tomo* (103)) and that on the advertiser side (*Yoji To Hoiku* (104)). In addition, because readers and advertisers are assumed to choose one of the magazines or an outside option once a year in our market model, the estimated brand values are measured in per-issue terms.

Table 4 reports the summary statistics of the brand value estimates. The first four columns report the estimated total brand value. The table indicates that the unweighted mean (average) brand value decreased from 38.628 million JPY in 2004 to 30.582 million JPY in 2010. While a drop in the minimum brand value from 2.853 million JPY in 2004 to 2.520 million JPY in 2010 was not so substantial, the maximum value significantly decreased to 83.699 million JPY in 2010, which was about two thirds of

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[18]For reference purposes, the OLS estimation result is also presented in Table 3 and the first-stage results are reported in Appendix B.

[19]The number in parentheses represents the ID of Table 14 in Appendix C.

what it was in 2004 (128.630 M). In short, the total brand value showed a downward trend throughout this period because highly branded magazines lost their value.

The next four columns present the results on the reader side, which shows that the reader side accounts for a large part of the total brand value. After the fall from 30.332 million JPY in 2004 to 26.265 million JPY in 2007, the average brand value on the audience side bounced back to 30.119 million JPY in 2010. Although the minimum was negative, its value improved annually. In contrast, the maximum was positive but constantly decreased from 188.590 million JPY in 2004 to 128.930 million JPY in 2010. Therefore, the revival in average brand values from 2007 was mainly due to readers' improved valuations for lower-branded magazines.

The last four columns show the brand value estimates on the advertiser side. First, the average brand value on the advertiser side was smaller in magnitude than that on the reader side and decreased drastically from 8.294 million JPY in 2004 to 0.464 million JPY in 2010. As is the case on the reader side, the minimum was substantially negative but its magnitude diminished during this period. However, the maximum showed a significant decline to 34.631 million JPY in 2010, which was smaller than half of the 2004 value (i.e., 73,110 M). Therefore, the brand value on the advertiser side demonstrated a sharp decline on average because advertisers lowered their evaluations of highly branded magazines.

= Table 4 =

Table 5 provides the summary statistics of brand value by genre. The results by genre show that on average, young (44.673 M), life (41.807 M), and weekly (42.509 M) magazines have higher brand values than others in total and on the reader side. In contrast, the results on the advertiser side show that they have a small or even negative brand value on average: e.g., the average brand value of young magazines was 5.134 million JPY and that of weekly magazines was -17.504 million JPY, respectively. On the advertiser side, senior or middle-age magazines had the largest brand values on average (10.741 M).

= Table 5 =

Table 6 presents a summary of the statistics by publisher. In total, NHK Publishing (65.031 M), Orangepage (53.124 M), and Kobunsha (48.360 M) published highly branded magazines on average. On the audience side, the magazines published by NHK Publishing (115.153 M), Fusosha (46.570 M), and Kobunsha (38.692 M) had relatively large brand values. On the advertiser side, their magazines had small or even negative brand values: e.g., while the magazines published by Kobunsha (9.239 M) had positive brand values, those of NHK Publishing (-50.122 M) and Fusosha (-1.757 M) had negative brand values. Seven & i Publishing (34.622 M), Hearst Fujingaho (33.657 M), and Orangepage (25.000 M) also published magazines with high brand values on the advertiser side.

= Table 6 =

According to the estimates of brand value for each magazine, the top five magazines with high total brand value were: 1. *CanCam* (7); 2. *MORE* (34); 3. *with* (72); 4. *NHK Kyo No Ryori* (38); and 5. *ViVi* (55). Although the magazines in this ranking are almost the same as those in the average ranking of brand equity on both sides of the market in the previous subsection, the order is somewhat different: e.g., while *CanCam* (7) is the first-ranked brand value, it is third for brand equity. As is the case with brand equity, the brand value results also show differences on each side of the market. The top five magazines on the reader side were: 1. *NHK Kyo No Ryori* (38); 2. *ESSE* (14); 3. *with* (72); 4. *MORE* (34); and 5. *ViVi* (55). However, those on the advertiser side were: 1. *25ans* (1); 2. *Oggi* (41); 3. *CanCam* (7); 4. *SPuR* (50); and 5. *ELLE Japan* (13). The estimated brand values on the reader and advertiser sides were negatively correlated again: the correlation coefficient is -0.582. The rankings on both sides of the market notably differ from those of brand equity. The complete list of estimated brand values in total, on the reader side, and on the advertiser side are reported in Appendix C.

4.3 Brand Value Decomposition

In this subsection, the decomposition technique of Olley and Pakes (1996) [29] for industry productivity is used to investigate the category-level dynamics in brand values in Japanese women's magazines. According to Olley and Pakes (1996) [29], the category-level brand value of women's magazines (ϕ_t), which is measured as a weighted average of each magazine's brand value (ϕ_{jt}) with their shares of circulation (w_{jt}) as weights, can be decomposed into the unweighted (arithmetic) mean and covariance between brand value and (share of) circulation.[20]

$$\phi_t = \sum_{j=1}^{J_t} w_{jt}\phi_{jt} = \bar{\phi}_t + \sum_{j=1}^{J_t}(w_{jt} - \bar{w}_t)(\phi_{jt} - \bar{\phi}_t), \tag{15}$$

where $\bar{\phi}_t$ and $\bar{w}_t(= 1/J_t)$ are unweighted mean of brand value and unweighted mean of share, respectively

In addition, because of its definition, the category-level total brand value is the sum of the category-level (i.e., weighted average of) brand value on the respective sides of the market, $\phi_t = \phi_t^x + \phi_t^a$, where

$$\phi_t^x = \sum_{j=1}^{J_t} w_{jt}\phi_{jt}^x = \bar{\phi}_t^x + \sum_{j=1}^{J_t}(w_{jt} - \bar{w}_t)(\phi_{jt}^x - \bar{\phi}_t^x), \tag{16}$$

and

$$\phi_t^a = \sum_{j=1}^{J_t} w_{jt}\phi_{jt}^a = \bar{\phi}_t^a + \sum_{j=1}^{J_t}(w_{jt} - \bar{w}_t)(\phi_{jt}^a - \bar{\phi}_t^a). \tag{17}$$

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[20]In this subsection, the subscript for publisher (f) is muted for simplicity of expression.

Therefore, the category-level brand value is also decomposed into four parts: unweighted mean of brand value on the audience side ($\bar{\phi}_t^x$), covariance between brand value on the audience side and circulation, unweighted mean of brand value on the advertiser side ($\bar{\phi}_t^a$), and covariance between brand value on the advertiser side and circulation.

= Figure 4 =

Figure 4 shows the trends in the estimated category-level (weighted mean of) brand values, in total, on the audience side, and on the advertiser side from 2004 to 2010. Therefore, the majority of brand values can be seen in the reader side: e.g., the brand values on the reader side accounted for over 90% of the total brand values in 2004. The category-level total brand value was 55.762 million JPY in 2004, but gradually declined to 41.147 million JPY in 2010. This decrease in the category-level brand value was mainly caused by the decline of the brand values on the advertiser side: e.g., the category-level brand value on the advertiser side sharply decreased from 4.711 million JPY in 2004 to 2,203 million JPY in 2008, and was even negative in 2009 (-3.386 M) and 2010 (-4.424 M). However, after the category-level brand value on the reader side also declined from 51.050 million JPY in 2004 to 43.604 million JPY in 2007, it began to increase and reached 45.570 million JPY in 2010, which compensated for a part of the negative brand values on the advertiser side.

= Table 7 =

Table 7 decomposes the category-level brand value into its unweighted means (average) and covariance with circulation. In this decomposition, while the unweighted mean (reproduced from Table 4) represents the average trend of brand values, the covariance represents the allocation effect of circulation on brand values: i.e., the larger the covariance term is, the circulation share goes to magazines with higher brand values, which may improve the category-level brand value.

The first three columns are the results in total. In total, as one can see in Table 4, the average brand value decreased and the covariance term declined from 17.134 million JPY in 2004 to 10.564 million JPY in 2010. Table 7 shows that, for Japanese women's magazines, the reallocation of circulation from magazines with high brand value to those with low brand value and the declining trend of average brand value resulted in a decrease in the category-level brand value.

The next three columns are the decomposition on the reader side. As shown in Table 4, after the decline in brand value on the reader side from 2004 to 2007, the average brand value resurged to 2010. On the other hand, the covariance term decreased from 20.717 million JPY in 2004 to 15.452 million JPY in 2010. Therefore, although the average brand value resurged around 2007, the reallocation from magazines with high brand value to those with low brand value finally resulted in a decrease in the category-level brand value on the reader side.

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The last three columns are the decomposition on the advertiser side, which shows a somewhat different picture. According to Table 4, while the average brand value on the advertiser side showed a sharp decline, it was still positive even in 2009 and 2010, when the category-level brand value on the advertiser side was negative. In contrast, the covariance term was negative and its magnitude became larger, which means that during this period, the magazines with low brand values on the advertiser side had a large circulation share and this negative correlation between brand value on the advertiser side and circulation became stronger throughout the period.

5 Concluding Remarks

This study utilized a hybrid framework of Goldfarb et al. (2009) [17] and an empirical framework for two-sided platforms to measure the brand values of Japanese women's magazines as an example of a media platform. In the framework, the brand value of each magazine is measured as the difference between the equilibrium profit produced by the magazine publisher under the status quo minus what the publisher would have earned if the magazine were unbranded, which represents the situation where it lost its brand equity. Therefore, this study constructs an oligopolistic market model of media platform competition, in which the indirect network effects between the audience (readers) and advertiser sides are incorporated explicitly, with the assumption of a pricing game on both sides of the market. In addition, the brand value estimates of this study reflect the actual choices of platform operators, audiences, and advertisers.

The empirical results are summarized as follows. First, the estimation results of demand functions on both sides of the market reveal the positive feedback between readers and advertisers: i.e., on average, advertisers prefer magazines with large audiences and readers appreciate advertising in magazines. Second, the average brand value in total, i.e., the sum of the reader and advertiser sides, decreased during this period. However, although the brand value on the reader side accounted for a large part of the total brand value, it was smaller in magnitude on the advertiser side. In addition, while the brand value on the reader side bounced back after a fall during the early years, it continued to decline on the advertiser side throughout the years. Moreover, the decomposition of the category-level brand value measured as a weighted average of each magazine's brand value with the shares of circulation as weights shows that, in the category-level total, the reallocation of circulation from magazines with high brand values to those with low brand values, which was accompanied by the downward trend of average brand values, resulted in the decline of the category-level brand value. The decomposition also reveals that, while the reader side demonstrated a similar pattern to the total, the magazines with low brand values on the advertiser side had a large circulation share and the negative correlation between brand values on the advertiser side and circulation became more significant

during this period.

As mentioned above, the limitation of this study is that we solved the market model for a hypothetical situation once and did not exhaustively search for all possible fixed points. The issue of multiple equilibria is a productive area in two-sided market research (Sriram et al. (2015) [36]); thus, it is an important subject for future research.

Appendix

A   Data

This study used yearly panel data for Japanese women's magazines, which were constructed from several sources. The advertisement page data were provided by MRS Advertising Research, Inc. and the information about circulation (on average per issue, in copies), cover price (in JPY), magazine size (including whether it is irregular or not), publication frequency, genre classification, and publisher name were supplemented from JMPA [18]. The record period for each edition of the JMPA [18] is summarized in Figure 5. For example, the 2008 edition reports the information from November 1, 2007 to September 30, 2008.

= Figure 5 =

The names of publishers in our sample and the number of their magazines in each year are presented in Table 8. The majority of magazines in our sample were published by Kobunsha, Kodansha, Magazine House, Shogakukan, Shueisha, and Shufunotomo.

= Table 8 =

To estimate the audience demand function specified as a nested logit form, the magazines in our sample were classified into eight genres based on that of the JMPA [18] (see Table 9). Most of our sample magazines were classified into Senior or middle-age, Young, and Young adult magazines.

= Table 9 =

The distribution of magazine formats and sizes are reported in Table 10; the magazine size was transformed into squared measures (mm^2) as in Table 10. Most of the magazines in our sample (437 out of 578) used the irregular A4 format.

= Table 10 =

Finally, Table 11 shows the distribution of publication frequency. Most of the magazines in our sample (489 out of 578) were published monthly. The number of issues per year was calculated based on the publication frequency as in Table 11.

= Table 11 =

B The First-Stage Regression of Demand Estimations

The first-stage regression results of endogenous variables on instruments in the demand estimation in Table 2 for the reader side and Table 3 for the advertiser side, are reported in Tables 12 and 13, respectively.

= Table 12 =

= Table 13 =

C Brand Equity and Brand Value by Magazine

Table 14 shows the estimation results of brand equity and brand value for each magazine. The brand equities are the estimates of magazine fixed effects in the demand estimations on the reader and advertiser sides in Tables 2 and 3, respectively. The base magazine on the reader side is *Fujin No Tomo* (103), and that on the advertiser side is *Yoji To Hoiku* (104), respectively. Their brand equities were set to zero.

Goldfarb et al. (2009) [17] regressed the fixed effect estimates of subbrands from the first-stage regression on four brand dummy variables and defined the estimated coefficient of brand dummy as "brand equity," and the residual as "subbrand equity" after the demand estimation of the US breakfast cereal market. On the other hand, this study defines the estimated magazine fixed effects in the demand estimations as the magazine's brand equity on each side of the market. Therefore, our measures of magazines' brand equities and brand values are the sum of brand (publisher) and subbrand (magazine). For more detail, please refer to the main text.

= Table 14 =

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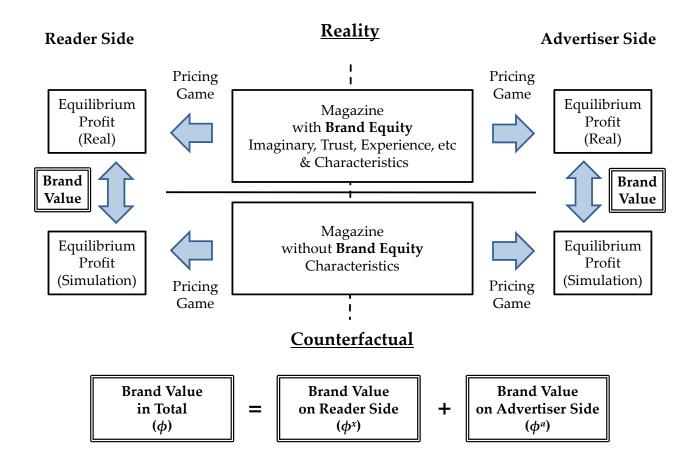
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Figure 1: A Framework for Brand Value Measurement

Reader Side | <u>**Reality**</u> | **Advertiser Side**

Pricing Game

| Equilibrium Profit (Real) | ← | Magazine with **Brand Equity** Imaginary, Trust, Experience, etc & Characteristics | → | Equilibrium Profit (Real) |

Brand Value ↕

Brand Value ↕

| Equilibrium Profit (Simulation) | ← | Magazine without **Brand Equity** Characteristics | → | Equilibrium Profit (Simulation) |

Pricing Game

<u>**Counterfactual**</u>

| **Brand Value in Total** (ϕ) | = | **Brand Value on Reader Side** (ϕ^x) | + | **Brand Value on Advertiser Side** (ϕ^a) |

Note: Adopted and extended from Goldfarb et al. (2009) [17].
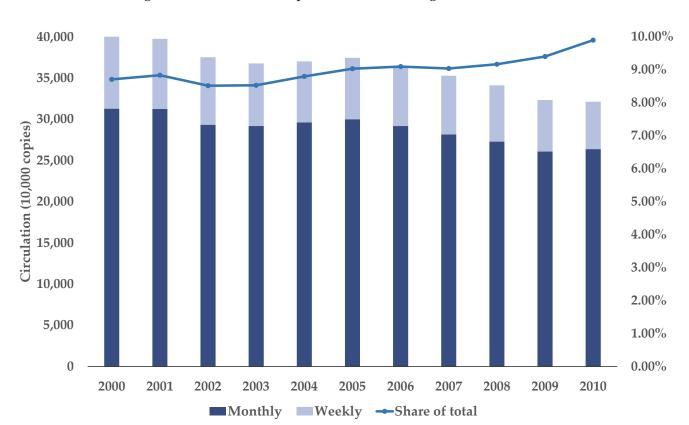
Figure 2: Circulation of Japanese Women's Magazines in the 2000s

Note: Based on the RIP [30]. Circulation is measured in 10,000 copies. The share of the total market is calculated as the relative share of women's magazines in the total circulation of magazines.

Figure 3: Advertisements in Japanese Women's Magazines in the 2000s
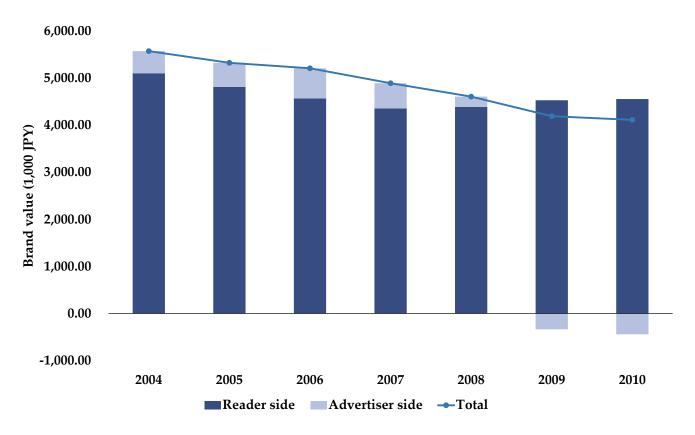
Note: Based on the NARI [27]. Advertisement is measured in pages. The share of the total market is calculated as the relative share of women's magazines in the total number of advertisement pages in magazines.

Figure 4: Category-level Brand Value

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. The weighted average of total brand values (ϕ_t) is the sum of those on the audience (ϕ_t^x) and advertiser sides (ϕ_t^a): $\phi_t = \phi_t^x + \phi_t^a$. For more detail, please see the text.

Figure 5: Record Periods of JMPA

Edition	from	to	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
			2003												
2004	2003/9	2004/8	2004												
2005	2004/9	2005/8	2005												
2006	2005/9	2006/8	2006												
2007	2006/9/1	2007/8/31	2007												
2009	2007/10/1	2008/9/30	2008												
2010	2008/10/1	2009/9/30	2009												
2011	2009/10/1	2010/9/30	2010												

Note: Details of record periods in each edition of the JMPA [18]. The first column is the edition year and the second and third columns show the start and end dates (months). This study assigned each edition to the corresponding year in the fourth column. The right panel illustrates the periods for reference purposes. Each edition reports the average circulation of magazines per issue for the corresponding period. For more detail, please see the text.

Table 1: Summary of the Statistics

		Mean	S.E.	Min	Max
Circulation	1,000 copies	203.90	153.93	24.90	880.00
Cover price	JPY	572.50	159.69	259.22	1,100.00
Advertising pages	pages	77.36	50.42	5.32	327.19
Advertising price	1,000 JPY	1,564.99	446.15	365.74	2,783.02
Contents pages	pages	178.64	73.42	40.00	563.75
Magazine age	years old	21.76	20.98	0.00	107.00
Size	1,000 mm²	62.72	5.77	31.08	93.55
Irregular size dummy		0.79	0.41	0.00	1.00
No. of issues/year	issues	15.11	8.73	4.00	48.00

Note: Calculation based on the data provided by MRS Advertising Research, Inc. The number of observations = 578. For more detail, please see the text.

	OLS			IV		
ln(Share w/i genre)	0.220	(0.032)	***	0.078	(0.026)	***
ln(Cover price)	−0.111	(0.196)		−1.905	(0.566)	***
ln(Advertising pages)	0.395	(0.041)	***	0.481	(0.109)	***
ln(Contents pages)	0.032	(0.047)		0.084	(0.095)	
Magazine age	0.043	(0.005)	***	0.026	(0.009)	***
Size	−0.017	(0.009)	*	−0.009	(0.007)	
Irregular size dummy	−0.072	(0.050)		−0.083	(0.036)	**
No. of issues/year	0.008	(0.004)	**	−0.013	(0.008)	
Constant	−9.855	(1.741)	***	2.557	(4.581)	
Magazine fixed effects	Yes			Yes		
Year fixed effects	Yes			Yes		
No. of observations	578			578		
Hansen J statistics (df = 6)	−			3.042		
R squared	0.982			0.975		

Note: Calculation based on the data provided by MRS Advertising Research, Inc. The OLS and IV estimation results are presented. In both specifications, the dependent variable is the log difference between the market share of each magazine and the outside option. The magazine fixed effects (base = *Fujin No Tom* (103)) and the year fixed effects (base = 2004) are included. In the IV specification, within-genre share, cover price, and advertising pages are endogenous, and instrumented by the number and average contents pages of all rival magazines, the average number of issues per year and the average age of rival magazines within the same genre, the average number of issues per year of own magazines within the same genre, the CGPI of printing paper, printing ink, and electric power, and the contractual cash earnings of printing and related industries (E15) in the BSWS. Robust standard errors are shown in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For more detail, please see the text.

Table 3: Advertiser Demand Estimates

	OLS			IV		
ln(Price of advertising)	−0.370	(0.188)	**	−3.965	(1.448)	***
ln(Circulation)	0.478	(0.069)	***	0.732	(0.345)	**
ln(Contents pages)	−0.585	(0.070)	***	−0.456	(0.152)	***
Magazine age	−0.048	(0.005)	***	−0.064	(0.017)	***
Size	0.000	(0.012)		0.005	(0.011)	
Irregular size dummy	0.016	(0.055)		0.067	(0.068)	
No. of issues/year	−0.014	(0.005)	***	−0.009	(0.005)	*
Constant	−5.761	(2.478)	**	37.702	(17.228)	**
Magazine fixed effects	Yes			Yes		
Year fixed effects	Yes			Yes		
No. of observations	578			578		
Hansen J statistics (df = 1)	−			2.691		
R squared	0.976			0.956		

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. The OLS and IV estimation results are presented. In both specifications, the dependent variable is the log difference between the market share of each magazine and the outside option. The magazine fixed effects (base = *Yoji To Hoik* (104)) and year fixed effects (base = 2004) are included. In the IV specification, advertising price and circulation are endogenous and instrumented by the number of all rival magazines, the ratio of irregular-sized rival magazines within the same genre, the average number of issues per year of own magazines, and the average contents pages of own magazines within the same genre. Robust standard errors are shown in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For more detail, please see the text.

	Total					Reader side				Advertiser side			
	No.	Avg.	S.D.	Min	Max	Avg.	S.D.	Min	Max	Avg.	S.D.	Min	Max
2004	77	3,862.77	2,704.02	285.30	12,863.00	3,033.28	3,236.20	−2,745.90	18,859.00	829.47	2,315.12	−8,050.80	7,311.00
2005	87	3,567.01	2,621.79	252.68	13,336.00	2,752.04	3,062.96	−2,803.20	18,582.00	814.97	2,181.11	−8,096.40	6,862.70
2006	84	3,547.97	2,568.57	240.63	15,421.00	2,664.76	2,939.34	−2,745.00	16,704.00	883.20	2,278.66	−7,170.20	7,978.60
2007	82	3,443.05	2,366.57	252.93	14,400.00	2,626.52	2,787.56	−2,956.30	16,076.00	816.54	2,140.11	−6,878.30	6,618.60
2008	87	3,235.99	2,173.66	285.39	11,694.00	2,639.93	2,746.67	−2,051.80	14,504.00	596.07	1,861.68	−6,239.70	5,214.50
2009	83	3,084.70	1,896.81	271.11	8,457.90	2,989.97	2,599.45	−969.52	14,384.00	94.73	1,548.31	−6,325.00	4,013.30
2010	78	3,058.29	1,828.56	252.02	8,369.90	3,011.86	2,576.90	−844.72	12,893.00	46.42	1,503.73	−5,495.90	3,463.10
Total	578	3,398.32	2,335.59	240.63	15,421.00	2,811.37	2,848.13	−2,956.30	18,859.00	586.95	2,018.47	−8,096.40	7,978.60

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. All figures are measured in 10,000 JPY. For more detail, please see the text.

Table 5: Brand Value Estimates by Genre

	No.	Total		Reader side		Advertiser side	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Genre:							
Pregnancy & Parenting	37	2,249.01	1,267.38	2,431.22	1,313.07	−182.19	339.48
Teens	30	2,575.77	1,032.81	3,534.54	1,989.07	−958.77	1,021.33
Young adult	168	3,181.58	2,485.29	1,470.12	2,643.13	1,711.46	1,856.36
Young	91	4,467.34	3,154.46	3,953.92	2,070.93	513.43	1,837.32
Weekly magazines	21	4,180.66	806.00	5,931.06	1,242.64	−1,750.41	578.23
Life	78	4,250.85	2,371.51	5,135.11	4,103.88	−884.27	2,402.52
Senior/middle age	107	3,369.51	1,669.04	2,295.34	1,732.68	1,074.18	1,546.25
Miscellaneous	46	1,800.26	702.34	1,119.62	1,311.04	680.63	1,610.16

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. All figures are measured in 10,000 JPY. For more detail, please see the text.

Table 6: Brand Value Estimates by Publisher

		Total		Reader side		Advertiser side	
	No.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Kadokawa Group	15	2,075.89	1,208.57	1,903.66	812.18	172.25	1,156.90
Hearst Fujingaho	29	2,978.88	1,050.78	−386.79	1,761.48	3,365.65	1,975.14
Adways Books	1	1,902.80	1,902.80	1,555.10	1,555.10	347.69	347.69
Orangepage	7	5,312.46	329.65	2,812.41	671.34	2,500.00	763.94
Starts Publishing	2	1,097.15	68.24	1,258.30	322.86	−161.21	254.61
Standard Magazine	1	1,547.50	1,547.50	1,122.60	1,122.60	424.82	424.82
Seven & i Publishing	3	3,224.23	503.52	−237.95	321.69	3,462.20	196.76
Benesse	28	3,525.39	1,276.49	3,636.36	1,309.63	−110.96	362.60
Bellsystem24	4	2,166.03	169.53	1,608.23	222.20	557.81	59.47
Magazine House	40	2,189.64	990.22	1,491.69	1,187.45	697.95	1,010.65
Gakkenn Group	16	2,290.31	513.60	2,960.51	672.52	−670.20	287.48
Keihanshin Lmagazine	7	2,182.13	30.92	3,498.34	117.83	−1,316.23	142.09
Kobunsha	44	4,836.00	1,908.21	3,869.20	1,643.68	966.80	1,619.79
Kodansha	45	4,595.83	3,385.67	2,923.52	3,975.25	1,672.28	1,449.44
Hankyu Communications	2	1,491.75	193.11	−178.91	571.95	1,670.70	765.09
Shufu to Seikatsu Sha	31	2,512.42	752.83	2,885.72	1,406.26	−373.30	966.43
Shufunotomo	61	2,505.64	1,193.93	2,304.91	1,025.60	200.73	948.78
Shueisha	52	4,770.96	2,696.64	3,847.06	3,416.95	923.90	2,250.81
Shogakukan	60	4,436.00	3,140.34	2,754.82	2,792.23	1,681.18	2,716.83
Shodensha	13	2,178.31	713.24	2,536.55	320.15	−358.25	473.54
Shinchosha	7	2,123.13	302.71	2,854.20	623.86	−731.05	336.32
Sekaibunka Publishing	16	3,641.97	2,070.26	1,785.92	2,231.35	1,856.06	990.57
Seishun Publishing	3	1,193.79	252.96	958.51	210.93	235.28	308.90
Futabasha Publishers	2	1,403.00	86.97	1,955.50	209.87	−552.48	122.88
Chuokoron-Shinsha	7	2,847.70	145.27	4,116.86	176.04	−1,269.13	169.42
Ushio Publishing	7	2,880.07	461.34	5,264.16	749.62	−2,384.10	295.52
Tokuma Shoten	2	1,463.10	9.62	1,908.85	51.12	−445.73	41.61
Nikkei Home Publishing	4	2,177.63	448.41	1,830.01	999.45	347.62	552.13
Hinode Publishing	14	1,726.56	236.19	1,594.16	557.51	132.39	405.74
NHK Publishing	13	6,503.18	3,069.64	11,515.34	5,297.22	−5,012.22	2,229.20
Fujin-No-Tomo-Sha	6	259.13	16.16	424.54	23.84	−165.41	7.97
Fusosha	15	4,481.23	3,413.84	4,656.98	4,299.74	−175.71	1,116.51
Bunka Publiching Bureau	14	2,120.94	1,339.00	2,081.37	801.59	39.59	601.88
Bungeishunju	7	1,858.69	225.41	1,167.54	242.02	691.15	450.48

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. All figures are measured in 10,000 JPY. For more detail, please see the text.

Table 7: Category-level Brand Value Decomposition

	Total			Reader side			Advertiser side			$\rho(\phi^x_j, \phi^a_j)$
		Avg.	Cov.		Avg.	Cov.		Avg.	Cov.	
2004	5,576.18	3,862.77	1,713.41	5,104.95	3,033.28	2,071.67	471.18	829.47	−358.30	−0.567
2005	5,327.42	3,567.01	1,760.41	4,816.27	2,752.04	2,064.23	511.13	814.97	−303.84	−0.539
2006	5,212.71	3,547.97	1,664.74	4,571.50	2,664.76	1,906.74	641.19	883.20	−242.01	−0.532
2007	4,894.65	3,443.05	1,451.61	4,360.43	2,626.52	1,733.91	534.24	816.54	−282.29	−0.556
2008	4,610.43	3,235.99	1,374.44	4,390.12	2,639.93	1,750.19	220.31	596.07	−375.76	−0.604
2009	4,192.46	3,084.70	1,107.76	4,531.03	2,989.97	1,541.06	−338.56	94.73	−433.29	−0.684
2010	4,114.70	3,058.29	1,056.41	4,557.03	3,011.86	1,545.18	−442.35	46.42	−488.77	−0.707

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. The category-level brand value in total, on the reader side, and on the advertiser side were measured in weighted means with circulation as a weight. They were decomposed into the unweighted mean (Avg.) and covariance terms between brand value and circulation (Cov.). $\rho(\phi^x_j, \phi^a_j)$ is a correlation coefficient between brand equity estimates on the reader and advertiser sides. All figures are measured in 10,000 JPY. For more detail, please see the text.

Table 8: Publisher

	2004	2005	2006	2007	2008	2009	2010	Total
Kadokawa	3	3	3	2	3	1	0	15
Hearst Fujingaho	5	5	5	4	4	3	3	29
Adways Books	0	0	0	0	0	1	0	1
Orangepage	1	1	1	1	1	1	1	7
Starts Publishing	0	0	0	0	1	1	0	2
Standard Magazine	0	0	0	0	0	0	1	1
Seven & i Publishing	0	0	0	0	1	1	1	3
Benesse	3	4	4	4	5	4	4	28
Bellsystem24	0	1	1	1	1	0	0	4
Magazine House	5	6	6	7	6	5	5	40
Gakkenn	2	2	2	2	2	3	3	16
Keihanshin Lmagazine	1	1	1	1	1	1	1	7
Kobunsha	5	6	6	6	7	7	7	44
Kodansha	6	7	7	7	6	6	6	45
Hankyu Communications	0	0	0	0	1	1	0	2
Shufu to Seikatsu Sha	4	5	5	5	4	4	4	31
Shufunotomo	10	10	9	9	8	8	7	61
Shueisha	6	8	7	6	9	8	8	52
Shogakukan	8	8	8	9	9	9	9	60
Shodensha	1	2	2	2	2	2	2	13
Shinchosha	1	1	1	1	1	1	1	7
Sekaibunka Publishing	2	2	2	3	3	2	2	16

Seishun Publishing	1	1	1	0	0	0	0	3
Futabasha Publishers	0	0	0	0	0	1	1	2
Chuokoron-Shinsha	1	1	1	1	1	1	1	7
Ushio Publishing	1	1	1	1	1	1	1	7
Tokuma Shoten	0	0	0	0	0	1	1	2
Nikkei Home Publishing	1	1	1	1	0	0	0	4
Hinode Publishing	2	2	2	2	2	2	2	14
NHK Publishing	2	2	2	2	2	2	1	13
Fujin-No-Tomo-Sha	0	1	1	1	1	1	1	6
Fusosha	3	3	2	1	2	2	2	15
Bunka Publiching Bureau	2	2	2	2	2	2	2	14
Bungeishunju	1	1	1	1	1	1	1	7
Total	77	87	84	82	87	83	78	578

Note: Based on the JMPA. "Kadokawa" represents the set of publishers, Kadokawa Cross Media, Kadokawa Group Publishing, Kadokawa Magazines, Kadokawa Shoten, and Kadokawa SS Communications, while "Gakken" represents Gakken Publishing and Gakushu Kenkyu Sha.

Table 9: Genre

		2004	2005	2006	2007	2008	2009	2010	Total
1	Pregnancy & Parenting	4	5	6	5	6	6	5	37
2	Teens	4	4	5	4	5	4	4	30
3	Young adult	28	31	25	24	21	20	19	168
4	Young	13	16	12	12	12	13	13	91
5	Weekly magazines	3	3	3	3	3	3	3	21
6	Life	12	14	12	12	12	9	7	78
7	Senior and middle age	12	13	12	14	18	19	19	107
8	Miscellaneous	1	1	9	8	10	9	8	46
	Total	77	87	84	82	87	83	78	578

Note: This classification is based on the JMPA.

Table 10: Magazine Format and Size

	Irregular	Width	length	Size	2004	2005	2006	2007	2008	2009	2010	Total
A4/Wide	1	210	297	62,370					1	1	1	3
A4	0	210	297	62,370	1		1	1	1	2	1	7
A4/Letter	1	210	297	62,370	1	1	1		1			4
A4/Irregular	1	210	297	62,370	58	66	63	62	65	63	60	437
A5	0	148	210	31,080		1	1	1	1	1	1	6
AB	0	210	257	53,970	3	3	3	3	5	5	4	26
AB/Irregular	1	210	257	53,970	2	2	1	1				6
B4/Irregular	1	257	364	93,548	1	1	1	1	1	1	1	7
B5	0	182	257	46,774	1	1	1	1				4
L	0	232	297	68,904	10	12	12	12	12	10	10	78
Total					77	87	84	82	87	83	78	578

Note: Based on the JMPA. The width and length are measured in mm, and the side is in mm².

Table 11: Publication Frequency

	No. of issues/year	2004	2005	2006	2007	2008	2009	2010	Total
Biweekly	24	1	1	1		1			4
Quarterly	4				1				1
2 per month	24	9	9	7	7	8	7	4	51
Monthly	12	62	72	71	69	74	71	70	489
Weekly	48	5	5	5	5	4	4	4	32
4 per year	4						1		1
Total		77	87	84	82	87	83	78	578

Note: Based on the JMPA.

Table 12: Frist-Stage Regression Results: Reader Side

	ln(Within share)			ln(Cover price)			ln(Ad. pages)		
ln(Contents pages)	−0.234	(0.121)	*	0.089	(0.024)	***	−0.547	(0.116)	***
Magazine age	0.048	(0.005)	***	−0.014	(0.001)	***	−0.022	(0.005)	***
Size	0.003	(0.018)		0.002	(0.003)		0.004	(0.010)	
Irregular size dummy	−0.075	(0.076)		−0.012	(0.014)		−0.052	(0.052)	
No. of issues/year	0.010	(0.008)		−0.007	(0.002)	***	0.003	(0.007)	
CGPI: paper * Size * Contents pages * Issues/year	−0.007	(0.003)	**	0.001	(0.001)	**	−0.005	(0.002)	**
CGPI: ink * Size * Contents pages * Issues/year	−0.001	(0.003)		0.001	(0.001)	*	−0.006	(0.002)	***
CGPI: electricity * Size * Contents pages * Issues/year	0.011	(0.005)	**	−0.002	(0.001)	**	0.010	(0.005)	**
BSWS: printing * Size * Contents pages * Issues/year	−0.001	(0.001)	*	0.000	(0.000)		0.000	(0.001)	
No. of rival magazines	−0.054	(0.003)	***	0.000	(0.000)		0.005	(0.002)	***
Issues/year of rivals w/i same genre	0.034	(0.012)	***	0.000	(0.002)		0.019	(0.007)	***
Age of rivals w/i same genre	−0.006	(0.004)		0.001	(0.001)	**	0.001	(0.002)	
Issues/year of own publisher's magazines	0.013	(0.005)	***	−0.002	(0.001)	**	−0.004	(0.004)	
Contents pages of rivals	−0.004	(0.007)		0.002	(0.001)	**	−0.009	(0.006)	
Constant	−5.985	(1.556)	***	7.134	(0.246)	***	8.884	(1.419)	***
Magazine fixed effects	Yes			Yes			Yes		
Year fixed effects	Yes			Yes			Yes		
R squared	0.952			0.989			0.965		
F(9, 454)	35.632		***	3.377		***	4.926		***

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. The number of observations = 578. The first-stage regression results of reader demand estimation in Table 2. F test statistics are those for testing the joint significance of excluded instruments. Robust standard errors are shown in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For more detail, please see the text.

Table 13: Frist-Stage Regression Results: Advertiser Side

	ln(Adverting price)			ln(Circulation)		
ln(Contents pages)	0.011	(0.011)		−0.339	(0.075)	***
Magazine age	−0.001	(0.001)	**	0.046	(0.004)	***
Size	0.001	(0.002)		−0.008	(0.008)	
Irregular size dummy	0.009	(0.010)		−0.075	(0.048)	
No. of issues/year	0.002	(0.001)		0.005	(0.004)	
No. of rivals	0.003	(0.002)	*	−0.012	(0.011)	
Share of irregular-sized rivals w/i same genre	0.021	(0.018)		0.122	(0.066)	*
issues/year of own publisher's magazines	0.003	(0.001)	***	0.007	(0.004)	*
Contents pages of own magazines w/i same genre	0.000	(0.002)		0.012	(0.000)	**
Constant	12.510	(0.198)	***	10.612	(1.003)	***
Magazine fixed effects	Yes			Yes		
Year fixed effects	Yes			Yes		
R squared	0.992			0.963		
F(4, 454)	3.349		***	2.408		**

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. The number of observations = 578. The first-stage regression results of advertiser demand estimation in Table 3. F test statistics are those for testing the joint significance of excluded instruments. Robust standard errors are shown in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For more detail, please see the text.

Table 14: Brand Equity and Brand Value Estimates by Magazine

		Brand equity						Brand value					
		Reader side			Advertiser side			Total		Reader side		Advertiser side	
		Est.	S.E.		Est.	S.E.		Mean	S.D.	Mean	S.D.	Mean	S.D.
1	*25ans*	1.357	(0.684)	**	7.817	(2.069)	***	3,495.56	738.76	−2,159.49	902.98	5,655.01	1,596.84
2	*AneCan*	2.813	(1.001)	***	4.444	(2.096)	**	5,131.55	170.26	4,394.43	297.90	737.11	331.85
3	*BOAO*	2.187	(0.965)	**	4.900	(1.981)	**	2,144.93	660.74	1,094.41	1,042.02	1,050.51	387.58
4	*Baby − mo*	1.941	(0.951)	**	2.160	(1.364)		1,556.10	355.99	1,730.65	447.83	−174.53	115.79
5	*CLASSY.*	2.229	(0.732)	***	5.918	(1.937)	***	4,913.47	757.00	2,814.24	872.18	2,099.23	651.99
6	*CREA*	1.742	(0.847)	**	4.684	(1.716)	***	1,858.69	225.41	1,167.54	242.02	691.15	450.48
7	*CanCam*	2.461	(0.812)	***	7.248	(2.308)	***	11,458.64	3,351.97	6,897.70	1,348.33	4,560.94	2,825.42
8	*Cawaii!*	2.036	(1.023)	**	3.477	(1.783)	*	2,269.80	559.80	2,589.84	533.99	−320.04	191.61
9	*Caz*	0.870	(1.075)		3.359	(1.465)	**	796.86	34.35	433.63	39.83	363.24	74.17
10	*ChouChou*	1.155	(1.131)		2.696	(1.497)	*	745.70	153.44	739.83	84.39	5.87	143.28
11	*Como*	1.915	(0.848)	**	4.579	(1.745)	***	2,018.81	287.56	1,646.86	193.36	371.97	286.64
12	*Domani*	2.126	(0.839)	**	5.168	(1.843)	***	3,653.76	513.48	998.65	283.50	2,655.11	735.18
13	*ELLE Japan*	1.371	(0.860)		5.730	(1.911)	***	2,932.09	208.00	−1,540.82	574.65	4,472.89	750.21
14	*ESSE*	2.556	(0.885)	***	6.222	(2.310)	***	8,397.85	626.96	9,711.12	368.79	−1,313.19	665.91
15	*FIGARO japon*	1.250	(0.885)		5.250	(1.779)	***	1,491.75	193.11	−178.91	571.95	1,670.70	765.09
16	*FRaU*	1.341	(0.944)		5.003	(1.724)	***	1,810.47	168.83	145.32	666.45	1,665.16	825.05
17	*FYTTE*	2.123	(0.921)	**	2.825	(1.522)	*	1,836.90	18.24	2,895.80	27.44	−1,058.95	45.61
18	*Fine*	1.218	(0.873)		4.779	(1.605)	***	1,703.90	191.39	1,253.22	417.23	450.66	260.95
19	*GINZA*	1.653	(0.924)	*	4.999	(1.820)	***	2,158.86	412.41	−48.58	290.40	2,207.43	653.08
20	*GISELe*	2.607	(0.909)	***	3.778	(1.897)	**	1,974.40	404.77	1,943.90	613.28	30.49	320.53

21	GLAMOROUS	2.576	(0.920)	***	4.237	(1.916)	**	2,746.95	202.49	2,315.23	494.67	431.70	413.68
22	GRACE	2.037	(0.914)	**	4.726	(1.875)	**	1,959.90	413.09	−19.80	672.95	1,979.70	259.79
23	Grazia	1.842	(0.775)	**	5.156	(1.717)	***	2,548.04	467.11	−243.10	526.36	2,791.11	837.79
24	HERS	2.823	(0.865)	***	4.339	(2.021)	**	2,138.00	401.39	2,117.47	559.32	20.56	161.47
25	Hanako	1.554	(0.903)	*	3.696	(1.593)	**	1,096.82	192.29	1,098.69	376.94	−1.88	219.68
26	Hanako WEST	1.295	(1.009)		2.679	(1.299)	**	1,047.14	23.62	819.61	198.66	227.53	193.37
27	JILLE	1.949	(1.117)	*	1.892	(1.494)		1,403.00	86.97	1,955.50	209.87	−552.48	122.88
28	JJ	2.218	(0.718)	***	7.132	(2.254)	***	6,519.77	2,661.48	4,893.31	1,427.86	1,626.49	1,406.29
29	JUNON	1.817	(0.834)	**	4.456	(1.722)	***	2,081.91	209.28	3,130.71	367.67	−1,048.80	192.08
30	LEE	2.254	(0.844)	***	6.187	(2.163)	***	5,425.03	346.80	4,719.44	781.44	705.62	493.40
31	LUCi	2.098	(0.953)	**	4.266	(1.795)	**	2,876.95	292.41	1,767.70	297.93	1,109.30	188.81
32	Lucere!	2.670	(0.983)	***	2.787	(1.787)		1,805.15	25.39	2,274.30	5.09	−469.15	20.30
33	MISS	1.491	(0.797)	*	5.525	(1.713)	***	1,910.19	398.49	67.41	1,228.29	1,842.80	995.14
34	MORE	2.390	(0.817)	***	7.480	(2.392)	***	10,345.24	1,959.28	8,124.30	1,167.11	2,220.92	1,016.46
35	Mart	2.430	(0.986)	**	3.528	(1.853)	*	2,082.57	940.52	2,228.32	1,145.25	−145.76	376.16
36	MyForties	1.926	(0.886)	**	3.530	(1.592)	**	1,413.55	314.73	1,192.11	332.19	221.42	17.42
37	NHK Oshare Kobo	3.072	(0.982)	***	1.963	(1.760)		3,465.82	332.09	6,282.90	601.20	−2,817.10	272.93
38	NHK Kyo No Ryori	2.607	(0.666)	***	6.623	(2.430)	***	9,106.63	1,272.92	16,000.29	2,230.28	−6,893.76	963.24
39	NumeroTOKYO	2.375	(0.958)	**	4.032	(1.953)	**	1,243.27	14.02	1,216.67	146.69	26.58	159.50
40	OZmagazine	1.365	(0.961)		3.070	(1.399)	**	1,097.15	68.24	1,258.30	322.86	−161.21	254.61
41	Oggi	2.176	(0.846)	**	6.019	(2.002)	***	5,806.80	454.86	944.02	1,161.22	4,862.76	1,604.98
42	PINKY	2.867	(0.987)	***	3.523	(1.968)	*	3,381.78	146.64	4,358.43	132.88	−976.63	234.60
43	PRETTY STYLE(PS)	2.322	(1.110)	**	2.810	(1.778)		2,700.24	503.26	3,404.06	484.68	−703.83	123.01
44	Pre−mo	1.565	(0.954)		1.448	(1.140)		1,026.67	205.09	962.27	180.24	64.40	141.51

45	*Ray*	2.200	(0.823)	***	5.299	(1.871)	***	4,606.11	694.06	2,948.17	657.39	1,657.94	1,303.83
46	*S − Cawaii!*	2.434	(0.970)	**	3.469	(1.781)	*	3,984.46	264.60	2,911.21	870.62	1,073.25	1,107.50
47	*SAVVY*	1.819	(0.899)	**	0.793	(1.094)		2,182.13	30.92	3,498.34	117.83	−1,316.23	142.09
48	*SAY*	1.360	(0.871)		4.566	(1.667)	***	1,193.79	252.96	958.51	210.93	235.28	308.90
49	*SEDA*	1.652	(1.047)		3.132	(1.550)	**	1,749.21	288.17	1,935.10	477.62	−185.89	228.54
50	*SPuR*	1.696	(0.805)	**	5.981	(1.948)	***	3,529.49	235.15	−987.59	482.35	4,517.07	707.56
51	*STORY*	2.974	(0.815)	***	4.506	(1.986)	**	5,742.03	837.29	4,446.73	582.21	1,295.30	715.56
52	*Seventeen*	1.990	(0.794)	**	3.693	(1.465)	**	4,430.10	398.02	7,292.63	807.96	−2,862.55	479.38
53	*Style*	2.011	(0.912)	**	4.177	(1.715)	**	2,199.35	236.55	851.41	550.99	1,347.95	646.62
54	*VERY*	2.557	(0.842)	***	4.868	(1.994)	**	5,824.51	485.58	3,130.66	876.56	2,693.80	1,084.70
55	*ViVi*	2.490	(0.809)	***	6.324	(2.075)	***	9,083.31	614.07	7,770.57	1,154.26	1,312.73	1,735.72
56	*Vingtaine*	1.917	(0.780)	**	5.914	(1.968)	***	2,515.90	495.76	920.84	417.30	1,595.07	911.49
57	*VoCE*	1.500	(0.978)		4.546	(1.742)	***	2,712.14	326.72	−628.02	332.32	3,340.14	604.86
58	*Zipper*	1.913	(1.039)	*	3.801	(1.776)	**	2,686.77	602.69	2,781.01	207.56	−94.25	510.68
59	*an ·an*	1.619	(0.774)	**	6.625	(2.105)	***	3,031.71	639.36	2,205.57	561.78	826.15	643.43
60	*ar*	1.833	(1.014)	*	2.533	(1.438)	*	1,784.40	102.28	1,984.17	95.36	−199.73	117.47
61	*bea's up*	1.671	(1.024)		3.225	(1.548)	**	2,019.07	285.83	1,518.43	260.15	500.62	102.78
62	*eclat*	2.385	(0.877)	***	3.939	(1.813)	**	1,488.73	200.42	1,092.73	129.51	396.03	309.67
63	*edu*	2.593	(0.962)	***	1.529	(1.530)		1,135.73	273.69	1,888.32	470.83	−752.59	203.65
64	*ef*	1.562	(0.760)	**	5.114	(1.677)	***	1,556.05	203.58	922.50	96.54	633.55	300.12
65	*marie claire*	0.787	(0.783)		6.084	(1.731)	***	1,237.50	125.45	−508.98	330.58	1,746.46	364.30
66	*marisol*	2.164	(0.874)	**	4.406	(1.810)	**	1,847.03	330.79	331.63	321.20	1,515.42	651.60
67	*mina*	2.571	(1.023)	**	3.022	(1.812)	*	3,061.01	320.76	3,886.79	535.32	−825.78	277.75
68	*nicola*	1.863	(1.119)	*	1.942	(1.509)		2,123.13	302.71	2,854.20	623.86	−731.05	336.32

69	*non·no*	2.178	(0.785)	***	7.335	(2.389)	***	5,894.03	721.13	6,420.26	524.56	−526.24	487.46
70	*pumpkin*	2.854	(0.936)	***	2.266	(1.672)		2,880.07	461.34	5,264.16	749.62	−2,384.10	295.52
71	*saita*	1.578	(1.075)		6.076	(2.273)	***	3,224.23	503.52	−237.95	321.69	3,462.20	196.76
72	*with*	2.615	(0.833)	***	7.253	(2.458)	***	9,779.34	1,759.67	9,278.30	437.21	500.93	1,492.29
73	*Ohayo Okusan*	2.318	(0.974)	**	3.468	(1.746)	**	2,717.10	445.77	3,445.27	732.23	−728.15	322.55
74	*Karada Ni Iikoto*	2.463	(0.996)	**	2.023	(1.580)		1,585.10	28.43	2,251.33	114.04	−666.25	117.53
75	*Sutekina Okusan*	2.195	(0.944)	**	5.110	(2.042)	**	3,416.29	239.19	3,434.73	627.28	−18.46	457.04
76	*Tamago Club*	1.791	(0.887)	**	2.024	(1.255)		3,070.44	370.19	2,921.89	671.31	148.55	358.70
77	*Tamahiyokokko Club*	1.903	(0.913)	**	2.891	(1.441)	**	1,771.98	335.93	1,920.24	343.88	−148.23	75.24
78	*Hiyoko Club*	2.085	(0.897)	**	2.675	(1.445)	*	4,304.16	471.19	4,652.99	454.47	−348.80	91.31
79	*Yuyu*	2.635	(0.899)	***	1.979	(1.472)		1,679.55	6.86	2,635.80	35.50	−956.31	42.33
80	*Orangepage*	1.688	(1.151)		6.186	(2.372)	***	5,312.46	329.65	2,812.41	671.34	2,500.00	763.94
81	*Croissant*	1.595	(0.944)	*	6.156	(2.139)	***	3,495.10	144.58	2,754.36	312.12	740.73	452.17
82	*Croissant Premium*	2.540	(0.965)	***	3.479	(1.916)	*	1,859.45	662.43	2,553.98	1,747.78	−694.54	1,166.83
83	*Sankyu!*	2.232	(1.133)	**	3.863	(1.970)	**	4,945.49	218.64	4,949.17	311.98	−3.69	498.89
84	*NIKITA*	1.970	(0.835)	**	5.019	(1.940)	***	1,648.27	333.78	−338.81	276.03	1,987.13	194.76
85	*Pichi Lemon*	1.480	(1.040)		2.817	(1.433)	**	1,993.07	276.72	2,494.24	255.40	−501.18	120.82
86	*Precious*	2.204	(0.883)	**	4.732	(1.845)	**	3,198.33	333.51	238.74	967.20	2,959.60	1,222.45
87	*MAQUIA*	1.584	(1.051)		4.271	(1.762)	**	2,442.00	165.66	−257.74	223.51	2,699.73	354.66
88	*Mrs*	1.913	(0.404)	***	7.748	(1.992)	***	3,376.60	433.85	2,793.90	410.44	582.72	300.56
89	*Maple*	3.010	(0.692)	***	4.348	(1.851)	**	3,483.30	18.67	4,098.05	267.64	−614.75	286.32
90	*LOVE berry*	1.737	(1.149)		1.261	(1.371)		1,463.10	9.62	1,908.85	51.12	−445.73	41.61
91	*Lettuce Club*	1.534	(1.172)		5.344	(2.188)	**	3,431.02	305.29	2,047.53	195.96	1,383.48	438.52
92	*Katei Gaho*	2.389	(0.532)	***	8.249	(2.105)	***	5,854.34	612.58	4,020.36	711.30	1,833.98	1,202.36

#	Magazine	Reader equity	(SE)		Advertiser equity	(SE)							
93	*Hanajikan*	3.002	(0.642)	***	1.687	(1.205)		1,513.90	243.63	2,662.08	388.37	−1,148.13	145.28
94	*Shufu No Tomo*	0.315	(0.372)		8.951	(2.064)	***	2,394.75	669.98	2,697.63	923.96	−302.85	274.19
95	*Shukan Josei*	1.232	(0.693)	*	5.326	(1.458)	***	3,137.41	261.39	4,375.20	409.48	−1,237.81	159.86
96	*Josei Seven*	1.777	(0.741)	**	5.554	(1.754)	***	4,707.97	370.14	7,199.73	368.01	−2,491.76	119.02
97	*Josei Jisin*	1.529	(0.691)	**	6.300	(1.781)	***	4,696.59	235.46	6,218.24	214.34	−1,521.67	256.89
98	*SO-EN*	0.642	(0.472)		5.475	(1.442)	***	865.29	132.39	1,368.84	197.69	−503.53	79.16
99	*NIKKEI WOMAN*	1.789	(0.918)	*	3.974	(1.629)	**	2,177.63	448.41	1,830.01	999.45	347.62	552.13
100	*Biteki*	1.543	(1.053)		4.536	(1.786)	**	2,672.16	311.49	−78.03	311.73	2,750.21	583.83
101	*Fujin Gaho*	0.407	(0.418)		11.239	(2.182)	***	3,951.27	647.97	2,066.81	303.95	1,884.44	932.92
102	*Fujin Koron*	0.683	(0.304)	**	8.143	(1.712)	***	2,847.70	145.27	4,116.86	176.04	−1,269.13	169.42
103	*Fujin No Tomo*	0.000			3.712	(0.529)	***	259.13	16.16	424.54	23.84	−165.41	7.97
104	*Yoji To Hoiku*	0.489	(0.541)		0.000			284.88	0.60	517.77	1.69	−232.89	1.10

Note: Calculations were based on the data provided by MRS Advertising Research, Inc. The brand equities are the magazine fixed effects in the demand estimations on the reader side (Table 2) and the advertiser side (Table 3). The base on the reader side is *Fujin No Tomo* (103), and that on the advertiser side is *Yoji To Hoiku* (104), respectively. Robust standard errors are shown in in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. The brand values are estimated based on our framework and measured in 10,000 JPY. For more detail, please see the text.