Economic and Political Impacts of Newspaper Mergers: Evidence from Japan

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Abstract

Although local newspapers are a major source of information on local political news and facilitate democracy at the local level, they have declined in circulation due to severe competition with other news outlets. Merger of local newspapers may help their operation and survival in the market. In this paper, I estimate the economic and political impacts of local-newspaper mergers. To identify merger effects, I use a historical event, namely the government-led local-newspaper integration in Japan during World War II; local newspapers in each prefecture were integrated into a new local newspaper that circulated within the prefecture. I find that the local-newspaper merger increased local newspapers' circulation, decreased national newspapers' circulation and increased voter turnout for gubernatorial and national elections.

Keywords: newspaper merger; local newspaper; national newspaper; voter turnout

JEL classification: D72; L11; L82; N85

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1 Introduction

Newspapers provide the electorate political information thereby enabling democracy. Recent studies find that active local newspapers increase voter turnout and politicians' accountability especially at the local level (Prat and Strömberg, 2013; Strömberg, 2015).[1] However, local newspapers have experienced a large drop in circulation. The two-sided nature of the industry, comprising a reader side and an advertiser side, leads to fierce market competition (Rochet and Tirole, 2003; Armstrong, 2006). Economies of scale in the industry provide cost advantages for large newspapers and drive small newspapers out of the market (Dertouzos and Trautman, 1990). In the U.S., where newspaper consumption preferences tend to be primarily local, a number of large cities have supported only one local newspaper. In Japan, where nationwide newspapers enjoy a large market share, local newspapers have lost ground to nationwide newspapers. A decline in local news dissemination may lead to a decline in citizens' interest in local political issues, which is a matter of particular concern.

A merger of local newspapers may help their operation and survival in the market.[2] Furthermore, if this argument is true, local-newspaper mergers, which help local news dissemination, might also improve citizens' political interest and participation. Using a historical event of the government-led local-newspaper integration during World War II in Japan, this paper examines the impact of local-newspaper mergers on local and national newspapers' circulations and on voter turnout.

Aimed at information control during the war, the Japanese national government implemented the newspaper integration policy whereby local newspapers in each prefecture were integrated into a single, new local newspaper that circulated within the prefecture (i.e. allowing only one local newspaper per prefecture). As a result, the number of daily newspapers published was reduced from 1,208 in 1938 to 55 in 1942. Although the market was deregulated after the war, the mergers unintentionally provided a dominant market position to local newspapers created by the merger

[1] See also the literature review paragraphs later in this section.

[2] For example, the U.S. Newspaper Preservation Act of 1970 allowed competing newspapers within the same local market to form joint operating agreements; under the Act, newspapers combine business operations and consolidate advertising, but have independent news editing.

over local newspapers that were newly established after the deregulation. Hence, local newspapers created by such mergers may have gained sufficient market power to counter a threat from national newspapers.

However, it is usually difficult to estimate causal effects of mergers on market outcomes.[3] Previous studies using observational merger data have compared market outcomes of merging firms with those of non-merging firms. To estimate the causal effect, an event of merger needs to be randomly assigned among firms. But, mergers are an endogenous choice of firms; thus, merging firms may differ from non-merging firms in unobserved ways that could also affect outcomes of interest.

Similarly, estimating the causal effects of media on political outcomes is difficult.[4] Previous research compares political outcomes in regions with active local media and those in regions with lower local media penetration. Again, local media activity (i.e. coverage and penetration) needs to be randomly assigned to estimate the causal effects of media. However, the electorate's political interests would remain unobserved to researchers and could affect both local media activity and political outcomes.

This study exploits the newspaper integration policy during the war to identify the effects of newspaper mergers on circulations and voter turnout. The integration of local newspapers was implemented at the national government's initiative (with the aim of information control), independent of the supply and demand conditions of the local-newspaper market. This event, therefore, overcomes the bias associated with other such studies and enables the estimation of the market impact of local-newspaper mergers and its further impact on voter turnout in Japan.

Using a classification made by Satomi (2011), I divide prefectures into three groups based on the pre-policy conditions of each local-newspaper market. Specifically, prefectures with more than two large local newspapers that competed with each other (Group 1); prefectures with regionally segmented markets, each of which had a large local newspaper (Group 2); and prefectures with at most one large local newspaper (Group 3). The policy is expected to have a larger impact on

[3] See also Nevo and Whinston (2010) and Angrist and Pischke (2010).
[4] See also Prat and Strömberg (2013).

Groups 1 and 2 than on Group 3 since several large local newspapers were merged in Groups 1 and 2 because of the policy. Conversely, the impact of the policy on Group 3 may be small since the policy only led to the abolition and merger of small newspapers.

I obtain two findings. First, I find that the merger of local newspapers increased local newspapers' circulation and decreased national newspapers' circulation. These results suggest that local newspapers established by the merger could exploit the benefit of economies of scale and prevent further expansion of national newspapers. This effect existed in prefectures where the pre-policy local-newspaper market was regionally segmented within the prefecture (Group 2). The effect lasted at least until 2010 and its size was largest around 1980; the local-newspaper mergers increased local newspapers' circulation per household by 20 percentage points and decreased national newspapers' circulation per household by 18 percentage points in 1980.

Second, I find that the merger increased voter turnout for gubernatorial, lower-house and upper-house elections. These effects are also confirmed for prefectures with regionally-segmented local-newspaper markets in the pre-policy period (Group 2). For example, the merger increased voter turnout by 8.8 percentage points for gubernatorial elections around 1983. Those two results suggest that an increase of local newspapers' reach due to the mergers would increase citizens' political participation.

This study is related to several strands of literature that analyse the newspaper industry.[5] The first strand comprises empirical studies on the effects of newspaper consolidation.[6] Romeo et al. (2003) show that newspapers with joint operating agreements in the U.S. set ad rates that are closer to those of competitive newspapers than those of monopolistic newspapers. Fu (2003) obtains an empirical result that indicates that frequent multi-market contacts of newspaper chains in the U.S. are associated with a decrease in the degree of circulation competition. George (2007) finds that ownership concentration in the U.S. newspaper market was positively associated with market product variety, which is defined using the job titles of reporters and editors. Chandra and Collard-Wexler (2009) find no statistical association between mergers and subscription prices, advertising

[5]Chandra and Kaiser (2015) provide a detailed survey of this topic.
[6]Foros et al. (2015) present a detailed survey of media mergers.

rates and circulations in Canada. Note that these papers compare outcomes of merging and non-merging newspapers to identify merger effects. Since the merger events in these papers are not randomly assigned among companies, there would be estimation bias concerns. The present study overcomes such bias by using mergers that were forced by the government, i.e. mergers that were exogenous to the newspaper companies of that time.[7]

This study also contributes to the growing literature on the effect of newspapers on political participation.[8] Gerber et al. (2009) find that randomly-assigned ten-week subscriptions of the *Washington Post* or the *Washington Times*, made prior to the 2005 Virginia gubernatorial election, did not increase voter turnout for the 2005 election significantly, but increased voter turnout for the national election in 2006. Gentzkow et al. (2011) find that a local-newspaper entry increased the U.S. presidential and congressional turnout; they also show that a large part of the effect comes from the first newspaper entry in the market. Drago et al. (2014) also find that the entry of a local-newspaper increased turnout in Italian municipal elections; in contrast to Gentzkow et al. (2011), they show that the effect was not limited to the first newspaper entry. Snyder and Strömberg (2010) find that a greater match between the newspaper market and electoral district decreased the roll-off in the U.S. house elections relative to presidential elections. Consistent to those studies, I also find positive effects of local newspapers on voter turnout. For identification, I use the local-newspaper integration policy, which was exogenous to voters' political interest.

Existing literature also examines the effect of competition among national and local newspapers. George and Waldfogel (2006) find that the increasing popularity of the *New York Times*, considered a national newspaper in the U.S., was associated with reduced local newspapers' circulation in high-education zones. They interpret this result in terms of consumer preferences;

[7]Fan (2013) and Gentzkow et al. (2014) examine the effects of newspaper mergers without using actual merger data, but by estimating the economic model structurally. An advantage of these studies is the quantification of the welfare effect of mergers, especially in counter-factual cases. See also Nevo and Whinston (2010) and Angrist and Pischke (2010).

[8]The literature confirms a positive effect of local newspapers on political accountability in various countries; see Besley and Burgess (2002) for India; Reinikka and Svensson (2005) for Uganda; Svaleryd and Vlachos (2009) for Sweden; Snyder and Strömberg (2010) for the U.S.; Bruns and Himmler (2011) for Norway; Drago et al. (2014) for Italy and Yazaki (2017) for Japan. The literature examines the effects of different media outlets on electoral participation; see Strömberg (2004) for radio; Gentzkow (2006) and Oberholzer-Gee and Waldfogel (2009) for television; and Czernich (2012) and Falck et al. (2014) for the Internet.

highly-educated people prefer the *New York Times* to local newspapers. In addition, George and Waldfogel (2008) find that a spread of the *New York Times* is also associated with reduced voter turnout among highly-educated individuals. Similarly, I find that political participation is higher in prefectures that have an increasing circulation of local newspapers and a decreasing circulation of national newspapers.

The remainder of this paper is organised as follows. Section 2 provides a background of the Japanese newspaper market and electoral system. Section 3 introduces the data used in this study. Section 4 describes the analytical framework. Section 5 reports the estimation results followed by the conclusion in Section 6.

2 Institutional background

This study is based on panel data from 44 prefectures that form the top tier of administrative divisions (below the national government) in Japan. I exclude Okinawa prefecture, which was under the United States military occupation between 1945 and 1972. Additionally, I exclude the two largest prefectures, Tokyo and Osaka, whose newspaper markets differ from the others in that they are a base for national newspapers, which provide decent local news coverage for their prefectures.

2.1 Japanese newspaper market and integration policy during WWII

Before WWII, the two largest newspapers of that time, *Asahi Shimbun* and *Mainichi Shimbun*, had a nationwide reach. In the 1920s and 1930s, these newspapers introduced modernised technology of printing press and transportation, and could thus enlarge sales and cover larger regions.[9] Consequently, many local newspapers had been losing ground to the national newspapers.

During WWII, the national government merged the various local newspapers in a prefecture into a single, new local newspaper per prefecture. This integration was aimed at controlling war-

[9] See Gentzkow et al. (2006) for an explanation of the corresponding technological progress of the U.S. newspaper market.

related information. The integration proceeded in three steps. First, from 1938 to 1940, the government abolished illegal newspapers, which did not pay legally mandated deposits.[10] Then, in 1940–1941, the government abolished or merged small newspapers. Finally, in 1942, large local newspapers were merged into a new local newspaper per prefecture. To estimate the impact of these mergers, I use circulation data for May 1940 as pre-treatment baseline values, to be compared with the post-treatment circulation data in the estimation.[11]

However, each prefecture had different local-newspaper market structures in the pre-policy period, which may have created different impacts of the respective newspaper mergers. Satomi (2011) examines the process of newspaper integration and provides a detailed explanation of the local-newspaper market in each prefecture during the pre-war period, using various information sources to classify these prefectures on the basis of their pre-policy market structure. I adopt this classification to categorise prefectures into three groups as detailed in the Data section.

After WWII, General Headquarters of the Allied Forces (GHQ) governed Japan between 1945 and 1951. GHQ re-opened the newspaper market resulting in new market entrants.[12] However, due to the sever shortage of paper in Japan at that time, GHQ tried to control the allocation of paper goods to newspaper companies using a quota system, until April 1951.[13] Quotas for each company did not reflect market demand; the quota system prevented existing and new companies from gaining new readers freely. Indeed, many new entrants were forced to cease publication. Due to limited competition, local newspapers created by the previous mergers had a strong advantage over newly-established local newspapers. Therefore, the impact of the integration policy would be realised after the recovery of newsprint paper production, i.e. after 1950 (see Figure 1).[14]

Following the full deregulation of the newspaper market, competition between national newspapers and local newspapers created through mergers has become severe. Competing with each other, the five national newspapers (*Yomiuri Shimbun*, *Asahi Shimbun*, *Mainichi Shimbun*, *Sankei*

[10]The deposit system was abolished after the war.

[11]Only Tottori prefecture concluded the integration before May 1940 (it was completed by October 1939). Six prefectures, including Okinawa prefecture, completed the integration in late 1940, 13 prefectures in 1941, and 27 prefectures, including Tokyo and Osaka, in 1942.

[12]See Ikawa (2008) for a detailed explanation of Japan's newspaper market between 1945 and 1951.

[13]GHQ also reviewed and controlled newspaper contents.

[14]The newsprint paper production quantity rose sharply around 1990 due to the bubble economy.

Shimbun and *Nihon Keizai Shimbun*) have actively advanced into local markets. To counter the influence of the national newspapers, local newspapers have increased focus on local information, thereby differentiating their content from that of the national newspapers (e.g., Rausch, 2012). The dissemination of local news has depended on the penetration of merger-created local newspapers and, thus, has been heavily (albeit unintentionally) affected by the newspaper mergers during WWII.

2.2 Electoral system

This paper also examines the impact of the local-newspaper mergers on voter turnout. It is expected that if the local-newspaper mergers increased the amount of local news disseminated, it would also influence citizens' political participation. This section briefly explains electoral systems in Japan.

In 1947, the local administrative system was dramatically changed with the establishment of the new Local Autonomy Act. Under the Act, prefectural governors are elected for a four-year term without term limits opposed to the previous practice of being selected and appointed by the national government. The first gubernatorial election was conducted in 46 prefectures on 5 April 1947. In the estimation, I use that election's turnout rates as base rates since the impact of the newspaper mergers appears small at that time. The timing of gubernatorial elections varies between prefectures, depending on incumbent governors' retirement/designation dates. To raise voters' electoral interest, the national government coordinates election dates every four years (unified local elections), where possible.[15] I use turnout rates for gubernatorial elections that took place on the day closest to a unified local election.

The first lower-house election of the National Diet after the war occurred in 1946, which was the first election with universal suffrage.[16] However, the electoral system of the lower house was changed in 1947 when the Constitution of Japan was enforced; the first election under the new constitution took place on 25 April 1947. As in gubernatorial elections, I use the turnout rates for the 1947 election as base rates since the 1946 election was held under the previous constitution

[15]The unified local elections took place in every April in 1951, 1955, 1959, and so on.
[16]The first lower-house election dates back to 1889.

and it was a period where wartime damages prevailed. Under the new constitution, members of the house are elected for a four-year term and the house could be dissolved by the Prime Minister at will.[17]

I also examine turnout rates for the upper-house elections of the National Diet. The upper house was newly created under the Constitution of Japan and its first election took place on 20 April 1947, which is used as a reference for base turnout rates in my estimation. Members of the house serve six-year terms with one-half of the membership renewed every 3 years. Unlike the lower house, the upper house cannot be dissolved.

3 Data

I adopt the classification by Satomi (2011) to categorise prefectures into three groups on the basis of pre-merger market conditions. The first group consists of 13 prefectures, each of which had more than two large, competing local newspapers.[18] Since such competing local newspapers had different political ideologies (Satomi, 2011), the merger of them may have resulted in loss of strongly ideological readers even whilst enjoying scale economies. The second group comprises 10 prefectures with regionally segmented markets, each with a large local newspaper.[19] It is expected that local newspapers created by the merger in this group could expand their sales throughout their respective prefectures. The third group comprises 21 prefectures each of which had at most one large local newspaper.[20] Prefectures in this group did not experience mergers of large local newspapers implying that the impact of the local-newspaper mergers would be smaller for these prefectures than for those in the first two groups. Therefore, I use the third group as a control group for the estimation.

Newspapers distributed within a prefecture include a combination of a national newspaper,

[17]The lower-house elections under the new constitution took place in 1947, 1949, 1952, 1953, 1955, 1958, 1960, 1963, 1967, 1969, 1972, 1976, 1979, 1980, 1983, 1986, 1990, 1993, 1996, 2000, 2003, 2005 and 2009.

[18]The prefectures are Aichi, Fukuoka, Ibaraki, Kagawa, Kagoshima, Kochi, Kumamoto, Kyoto, Oita, Saga, Shimane, Tokushima and Ymaguchi.

[19]The prefectures are Ehime, Fukushima, Hokkaido, Iwate, Kanagawa, Nagano, Niigata, Shizuoka, Toyama and Yamagata.

[20]The prefectures are Akita, Aomori, Chiba, Fukui, Gifu, Gunma, Hiroshima, Hyogo, Ishikawa, Mie, Miyagi, Miyazaki, Nagasaki, Nara, Okayama, Saitama, Shiga, Tochigi, Tottori, Wakayama and Yamanashi.

the local newspaper of the respective prefecture, or local newspapers published for other prefectures. I cover daily and general-interest newspapers and exclude specialty newspapers (e.g. sports, tabloids). My data set comprises newspaper circulations for 1940, 1962–1968 and 1970–2010; I could not collect data for 1941–1961 and 1969 due to limited data availability. For explained variables, I use (1) total circulation of local newspapers per household for the prefecture and (2) total circulation of national newspapers per household.

The data for 1940 is from Ariyama and Nishiyama (2000), who edited discovered documents about the Information Agency, which was the central agency responsible for the implementation of the newspaper integration policy. Data for 1962–2010 is obtained from a newspaper report published by the Japan Audit Bureau of Circulations, the Annual Survey released by the Japan Newspaper Publishers & Editors Association, and the Japan Mass Communication List issued by *Bunka* News. The first source covers many large newspapers including national newspapers and local newspapers resulting from the mergers while the other sources cover small local newspapers. For newspapers that publish both morning and evening editions, I use the data of the morning edition.

Figure 2 represents time-series trends of national and local newspapers' circulations per household by group. The figure shows that prefectures with regionally segmented pre-policy markets (Group 2) have higher local-newspaper reach but lower national-newspaper reach than the control prefectures (Group 3).

To examine the political effects of newspaper mergers, I use voter turnout rates for (1) gubernatorial, (2) lower-house and (3) upper-house elections based on data from the Ministry of Internal Affairs and Communications. Figure 3 represents time-series trends for average voter turnout rates for each election by group. The figure shows that prefectures that had regionally segmented markets in the pre-merger period (Group 2) have slightly higher voter turnout than control prefectures (Group 3).

Given the classification of prefectures based on pre-merger market structures, it is important to reduce potential omitted-variable bias by controlling for factors that could influence pre-merger market structures (elaborated in the next section). I use the 1940 (1) population density (obtained

from the Ministry of Internal Affairs and Communications), (2) per-capita income based on the prefecture version of GDP estimated by Yuan et al. (2009), and (3) proportion of fresh graduates of lower secondary schools advancing to upper secondary schools (obtained from the Ministry of Education, Science and Culture). Each of these values is interacted with year dummies in the estimation. Due to limited data availability, I only control population sizes as a time-variant variable.

Table 1 reports the mean values of dependent and control variables by group and by specific period (initial year and later years).

4 Analytical framework

To estimate the economic and political effects of the newspaper mergers, I adopt the following specification:

$$\begin{aligned} y_{it} = &\sum_t \beta_t^c \times 1\{\text{Prefectures had competitive markets previously (Group 1)}\}_i \times Year_t \\ &+ \sum_t \beta_t^s \times 1\{\text{Prefectures had segmented markets previously (Group 2)}\}_i \times Year_t \\ &+ \gamma \cdot Controls_{it} + \alpha_i + \delta_t + \epsilon_{it}, \end{aligned} \tag{1}$$

where $1\{\cdot\}$ denotes an indicator function, α_i denotes a prefecture fixed effect, δ_t denotes a year fixed effect, and ϵ_{it} denotes the error term for prefecture i in year t. Dependent variable y_{it} is either (local or national) newspapers' circulation per household or the (gubernatorial, upper-house or lower-house) election turnout rate for prefecture i in year t. I estimate equation (1) using ordinary least squares with standard errors clustered at the prefectural level.

The basic idea of this estimation strategy is to compare changes in outcomes between the groups. Values of β_t^c show the merger effect for the prefectures with previously competitive local-newspaper markets (Group 1) compared to the control prefectures (Group 3). Values β_t^s indicate the effect for prefectures with segmented markets in the pre-merger period (Group 2) relative to

the control group. If the newspaper merger helps local newspapers confront national newspapers, values of β are positive for the estimation of local-newspaper reach and negative for the estimation of national-newspaper reach. In addition, if the effect of the merger leads to improved voter turnout, values of β are positive for the estimation of gubernatorial, lower-house and upper-house election turnout.

The key for my identification strategy is that the distribution of pre-policy market structures is not correlated with changes in newspaper reach or changes in voter turnout except through the newspaper merger. Although a prefecture-level fixed effect could partial out time-invariant effects of time-invariant factors, it cannot perfectly control for time-variant effects of time-invariant factors. Consider the degree of population density. During the pre-policy period, prefectures with a high degree of population density may have a competitive local-newspaper market while prefectures with a low degree of population density may have a regionally segmented market. However, highly populated urban areas, which suffered from severe war damage, made a dramatic recovery post-war such that people living in those areas may have had different newspaper consumption patterns and voting behaviours from people living in other areas. These effects can be excluded by incorporating the population level and the interaction term between the pre-policy population density level and year dummies into the equation.

Other possible biases arise from income levels. High-income prefectures may have several large local newspapers before the merger while low-income prefectures were expected to grow faster than high-income prefectures after the war (Barro and Sala-I-Martin, 1992). If newspaper consumption patterns and voting behaviours differ by stage of economic development, the estimated values would reflect the effect of economic growth. To eliminate this effect, I use the interactions between the pre-policy income level and year dummies. This type of biases may also exist in the case of education levels. Thus, I also use the interaction between the pre-policy education level and year dummies.[21]

To examine the robustness of estimation results, I use population size as a weight in the regres-

[21]Due to limited data availability, I could not collect the data for prefecture-level income and education over the whole period.

sion. Since the dependent variables are average outcomes, the population weight could improve the estimation precision.[22] In addition, the weight enables the estimation of the population-averaged partial effects, thereby illuminating whether the effect of the merger varies by population size (Solon et al., 2015).

5 Results

5.1 Newspaper circulation

This section examines the effects of the local-newspaper mergers on local and national newspapers' circulations. Table 2 (Table 3, resp.) presents the selected estimation results using local (national, resp.) newspapers' circulation per household as the explained variable. The estimation results of the interaction terms with the other year dummies (e.g. 1963–1968, 1971–1979) are omitted due to space limitations. Specifications of each table have the same control variables and weights. Specification (1) does not include any interaction term between pre-policy control variables and year dummies; specification (2) controls for the effect of population density in 1940; specification (3) controls for the effect of prefectural GDP in 1940; specification (4) controls for the effect of education level in 1940; specification (5) controls for the effects of those three pre-policy variables; and specification (6) uses a population weight in the estimation while adding the same control variables as in specification (5). Figure 4 (Figure 5, resp.) shows the time series of the estimated effect on local (national, resp.) newspapers' circulation for each group, using the estimation results of specification (5) in Table 2 (Table 3, resp.).

5.1.1 Local newspaper

Table 2 and Figure 4 show that local-newspaper mergers increased local-newspaper reach for prefectures with regionally-segmented markets pre-merger (Group 2). In particular, Figure 4 shows

[22] I also used household size as a weight in the estimation of newspaper reach and used eligible-voter size as a weight in the estimation of voter turnout. The estimated results did not vary from the results obtained using the population weight.

that the size of the effect increased until mid-1980s and declined during the 1990s and 2000s, although remaining positive and statistically significant. A potential reason for this time-series pattern would be the plateau of newspaper production from the early-1980s (see Figure 1), when newspaper companies were engaged in price competition rather than circulation competition (Haruhara, 2003). This fact suggests that the merger impact on circulations was weaken. The estimated value of 0.200 for the interaction term with the 1980 dummy in specification (5) (see Table 2) implies that the mergers raised local newspapers' circulation per household by 20 percentage points for prefectures in Group 2.

However, the mergers did not have any statistically significant impact for prefectures where the pre-policy market was highly competitive (Group 1). This may imply that the compelled merger of competing newspapers did not function well since competing newspapers had conflicting ideologies.

Table 2 confirms the robustness of the estimated effect of the merger.[23] In particular, the result using the population weight in specification (6) does not differ from the non-weighted result in specification (5), suggesting that the size of the effect would not vary by population size.

5.1.2 National newspaper

Table 3 and Figure 5 show that the mergers reduced national-newspaper reach for prefectures with regionally segmented markets in the pre-policy period (Group 2). Figure 5 indicates that the effect increased until mid-1980 and decreased slightly thereafter. The estimated value of -0.192 for the interaction with the 1980 dummy in specification (5) (in Table 3) means that the mergers reduced national newspapers' circulation by 19.2 percentage points for the prefectures in Group 2. The sign and size of the estimated parameters are consistent with the estimation results for local-newspaper reach, discussed in the previous section. The government-implemented mergers helped local newspapers' activities and counteracted the expansion of national newspapers.

The results of specifications (1)–(5) listed in Table 3 illustrate the estimation robustness through the inclusion of control variables. However, the estimation results using population weight in

[23] On controlling for the effect of prefectural GDP in 1940, the estimated result become slightly high.

specification (6) however are slightly larger (in absolute terms) than the results of the non-weighted estimation in specification (5), especially after 1990. This would suggest that there was a greater influence on large prefectures than on small prefectures. A potential explanation of this result would be that local newspapers in large prefectures could enjoy a larger benefit of scale economies and accordingly could curtail the expansion of national newspapers.

Consistent with the case of local-newspaper circulation, the mergers did not influence prefectures with previously competitive markets (Group 1). The effect of the merger was limited to prefectures with regionally segmented markets in the pre-policy period (Group 2).

5.2 Voter turnout

Table 4 (Table 5, Table 6, resp.) presents select estimation results using voter turnout rates for gubernatorial (lower-house, upper-house, resp.) elections as the explained variable. Each specification in the tables has the same control variables and weights as the corresponding specifications in Table 2. Figure 6 (Figure 7, Figure 8, resp.) shows the time series of the estimated effects for each group, using the estimation result for specification (5) in Table 4 (Table 5, Table 6, resp.).

5.2.1 Gubernatorial election

Table 4 and Figure 6 show that the merger increased gubernatorial election turnout for prefectures with regionally segmented markets in the pre-policy period (Group 2). Figure 6 indicates that the effect was particularly large during the 1980s, coinciding with the peak merger effect on newspaper circulations. For example, the estimated value of 0.088 for the interaction with the 1983 dummy in specification (5) (in Table 4) implies that the merger increased voter turnout rates for gubernatorial elections held around 1983 by 8.8 percentage points for prefectures in Group 2. This suggests that the local-newspaper merger protected local-newspaper activities, which also improved voter turnout in the local election. This result is robust with respect to the choice of control variables and weights.[24]

[24]Note that the estimated effects on gubernatorial election turnout rates are more volatile than those on lower- and upper-house election turnout rates (discussed in the next subsections). A potential reason of this large variation would

Consistent with the estimated results for newspaper circulations, the mergers did not influence voter turnout for prefectures with previously competitive markets (Group 1).

5.2.2 Lower-house election

Table 5 and Figure 7 show that the mergers increased lower-house election turnout rates for prefectures with regionally segmented markets pre-merger (Group 2). Figure 7 indicates that the effect was larger for elections before 1972 than those after 1972. The peak merger effect in this case was earlier than the corresponding peaks for newspaper circulations and for gubernatorial election turnout. This difference may be related to the proliferation of colour television during the 1970s with citizens exposed to more national news on television. Thus, the merger impact would likely weaken sooner for the national election than for the local election. The estimated value of 0.045 for the interaction with the 1972 dummy in specification (5) (in Table 5) implies that the mergers increased voter turnout rates for the 1972 lower-house election by 4.5 percentage points for the prefectures in Group 2.

Consistent with previous results, the mergers did not influence voter turnout for prefectures with a competitive market in the pre-policy period (Group 1).

5.2.3 Upper-house election

Table 6 and Figure 8 show that the mergers increased upper-house election turnout for prefectures with regionally segmented markets before the merger (Group 2). Figure 8 indicates that the effect was larger during the 1960s and early 1970s than in other periods. For example, the estimated value of 0.046 for the interaction with the 1971 dummy in specification (5) (in Table 6) implies that the merger increased voter turnout rates for the 1971 upper-house election by 4.6 percentage points for the prefectures in Group 2. The size and time-series pattern of the estimated effect are similar to those of the lower-house election turnout discussed in the previous section.

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be that each prefecture holds gubernatorial election at different dates while national elections take place at the same date. Thus, gubernatorial election turnout rates would be strongly influenced by various other factors (e.g. nationwide economic performance and political situation), which cannot be controlled in my estimation.

Again, the newspaper mergers did not influence voter turnout for prefectures with a previously competitive market (Group 1).

6 Conclusion

This paper has examined the economic and political effects of local-newspaper mergers. It is usually difficult to estimate causal effects of newspaper mergers on market outcomes and of newspapers on voting. Japan's government-led local-newspaper mergers during the WWII provide a variation that is exogenous to newspaper publishers and newspaper consumers. Exploiting this variation, this paper finds that the local-newspaper mergers increased local-newspaper reach, decreased national-newspaper reach, and increased voter turnouts for gubernatorial and national elections. These effects are confirmed in prefectures with regionally segmented local-newspaper markets in the pre-merger period.

Certain caveats to this study must be stated. The estimation results show that mergers among large and competing local newspapers did not increase their circulation. An explanation of this result could come from the fact that competing newspapers existing prior to the merger had different political ideologies (Satomi, 2011). A merger of ideologically-conflicting newspapers may have different effects; such mergers would result in new new companies that are able to benefit from scale economies but are less ideological and hence, prone to losing ideological readers. This paper however cannot answer further questions on newspapers' ideological issues. Since newspapers' political biases could influence voting behaviours (e.g. Ladd and Lenz, 2009; Chiang and Knight, 2011), future research should investigate the effect of mergers based on ideological differentiation.

Another caveat concerns the short-run effects of newspaper mergers. Although this paper finds long-run impacts of mergers, it cannot estimate short-run effects due to the lack of data. The effect of newspaper mergers may need time to be realised since new newspapers' quality and editorial stance are not immediately perceivable. Future studies should try to estimate the duration required to realise merger effects.

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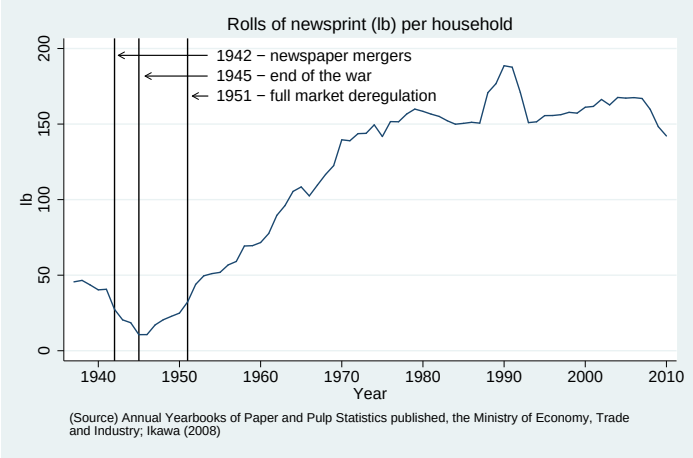


Figure 1: Time series of newsprint paper production quantity in rolls (lb) per household

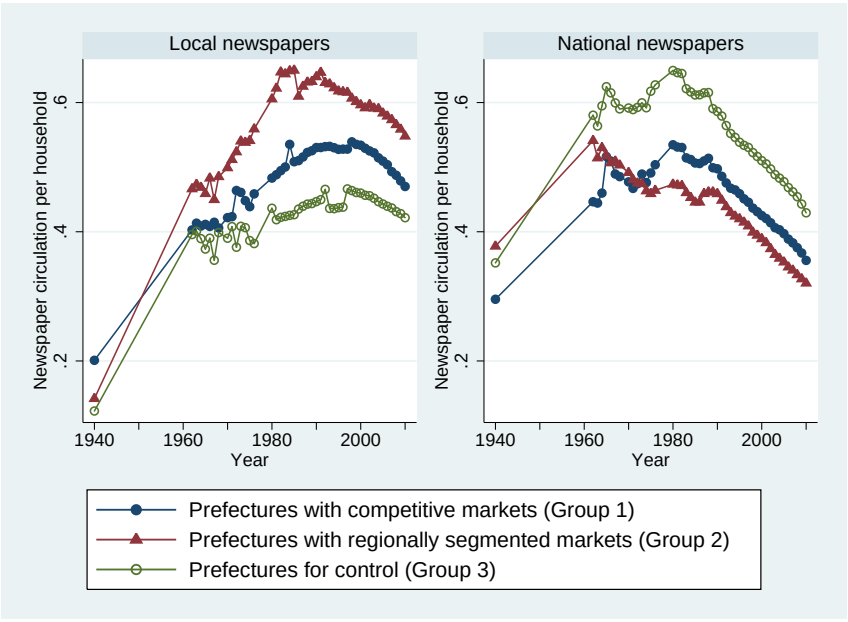


Figure 2: Time series of newspaper circulations per household by group

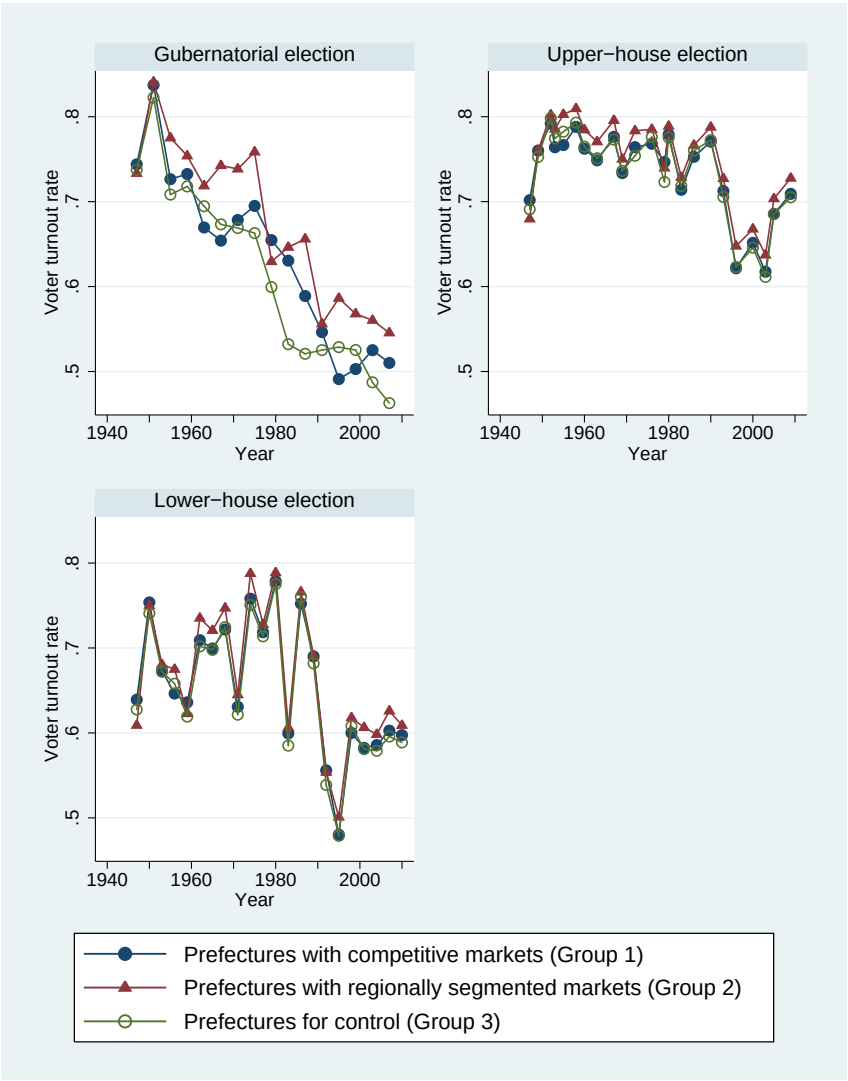


Figure 3: Time series of voter turnout rates by group

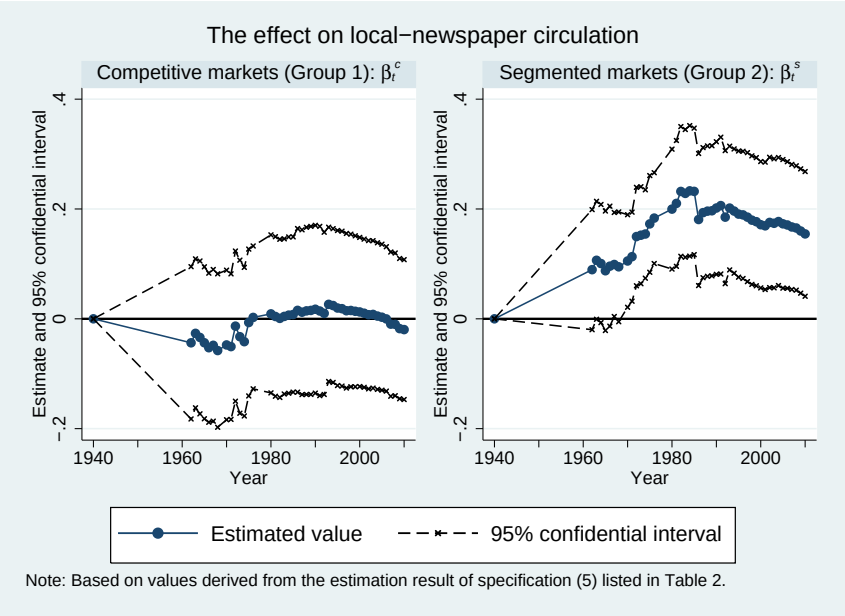


Figure 4: Estimated effects of the newspaper mergers on local-newspaper circulations

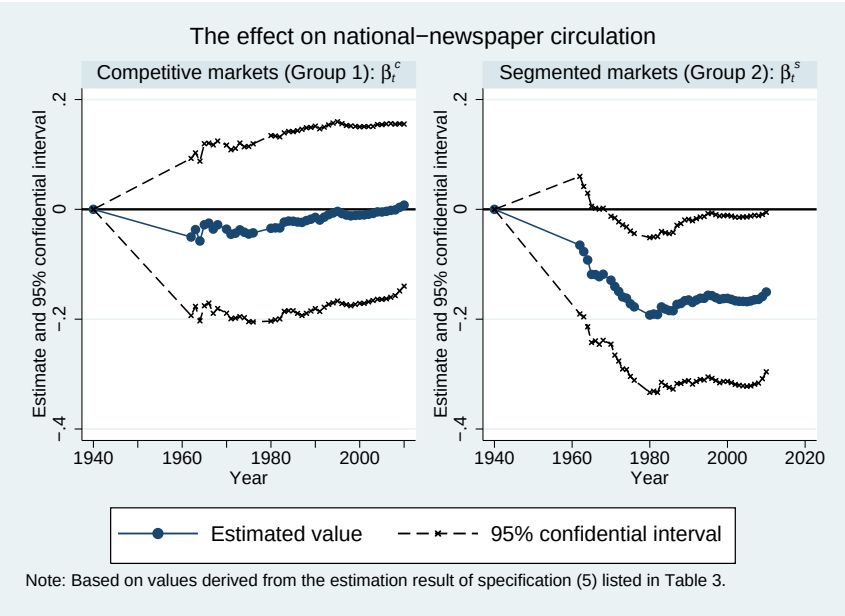
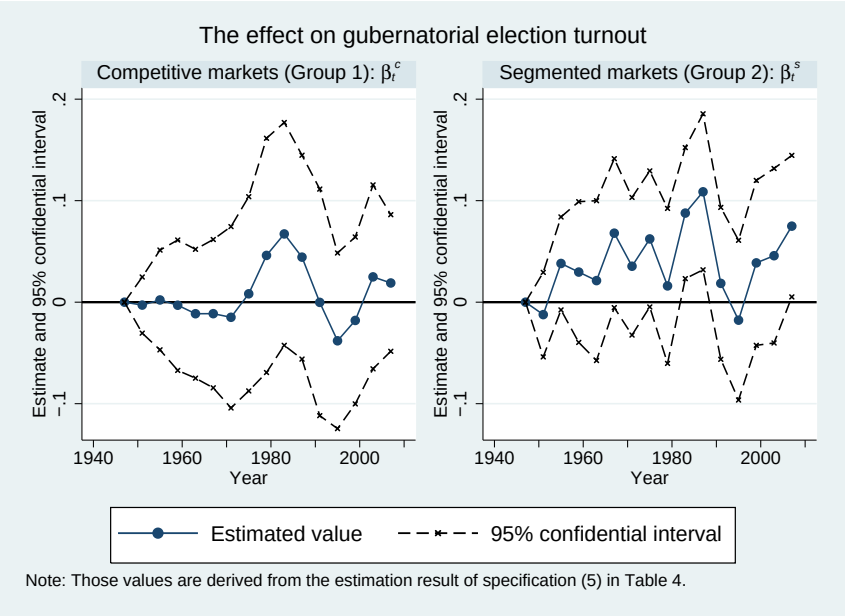
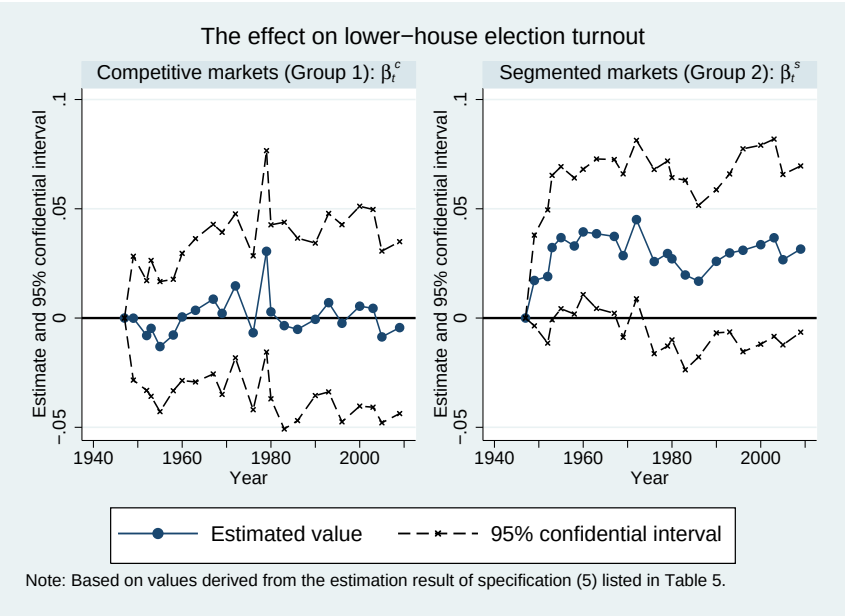


Figure 5: Estimated effects of the newspaper mergers on national-newspaper circulations



Note: Those values are derived from the estimation result of specification (5) in Table 4.

Figure 6: Estimated effects of the newspaper mergers on gubernatorial election turnout rates



Note: Based on values derived from the estimation result of specification (5) listed in Table 5.

Figure 7: Estimated effects of the newspaper mergers on lower-house election turnout rates

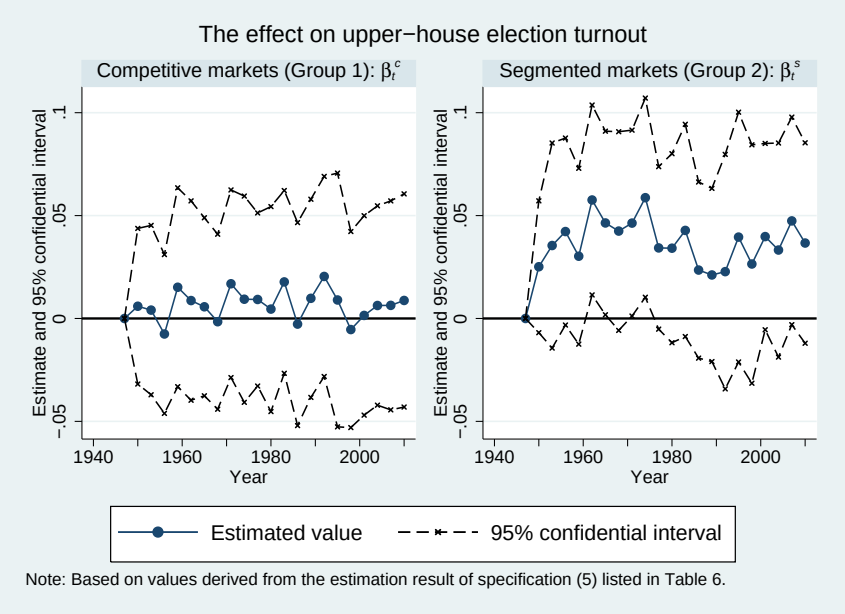


Figure 8: Estimated effects of the newspaper mergers on upper-house election turnout rates

Table 1: Mean of dependent and control variables

Variable	Period	Obs.	All prefectures	Prefectures with competitive markets (Group 1)	Prefectures with segmented markets (Group 2)	Prefectures for control (Group 3)
Local-newspaper circulation per household	1940	44	0.150	0.201	0.142	0.123
	1962-2010	1925	0.479	0.487	0.577	0.426
National-newspaper circulation per household	1940	44	0.341	0.296	0.378	0.352
	1962-2010	1931	0.503	0.461	0.437	0.560
Gubernatorial election turnout	1947	44	0.738	0.744	0.733	0.738
	1951-2007	646	0.628	0.627	0.671	0.608
Lower-house election turnout	1947	44	0.692	0.702	0.680	0.691
	1949-2009	968	0.739	0.736	0.752	0.736
Upper-house election turnout	1947	43	0.627	0.639	0.609	0.628
	1950-2010	924	0.657	0.656	0.669	0.651
Population density (thousand per km^2)	1940	44	0.233	0.283	0.223	0.208
Prefectural GDP per capita (thousand yen)	1940	44	0.442	0.462	0.470	0.415
Prop. of upper secondary school entrants	1940	44	0.103	0.113	0.102	0.097

Table 2: Estimation results for local-newspaper circulations

	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for competitive market						
(Group 1)						
× Dummy for Year 1962	-0.053	-0.034	-0.041	-0.058	-0.044	-0.040
	(0.065)	(0.069)	(0.066)	(0.068)	(0.069)	(0.055)
× Dummy for Year 1970	-0.066	-0.041	-0.046	-0.058	-0.048	-0.044
	(0.061)	(0.066)	(0.064)	(0.066)	(0.068)	(0.052)
× Dummy for Year 1980	-0.025	0.012	0.011	-0.003	0.009	-0.002
	(0.068)	(0.070)	(0.068)	(0.071)	(0.071)	(0.056)
× Dummy for Year 1990	-0.019	0.023	0.020	0.006	0.018	0.005
	(0.071)	(0.075)	(0.072)	(0.075)	(0.076)	(0.062)
× Dummy for Year 2000	-0.019	0.024	0.022	-0.001	0.013	-0.006
	(0.063)	(0.067)	(0.063)	(0.067)	(0.067)	(0.058)
× Dummy for Year 2010	-0.045	-0.006	-0.010	-0.028	-0.020	-0.047
	(0.056)	(0.062)	(0.058)	(0.059)	(0.063)	(0.056)
Dummy for segmented market						
(Group 2)						
× Dummy for Year 1962	0.085	0.080	0.093	0.082	0.090	0.076
	(0.058)	(0.054)	(0.056)	(0.059)	(0.054)	(0.047)
× Dummy for Year 1970	0.092**	0.088**	0.108**	0.094**	0.105**	0.107**
	(0.045)	(0.043)	(0.043)	(0.045)	(0.042)	(0.040)
× Dummy for Year 1980	0.166***	0.165***	0.201***	0.172***	0.200***	0.189***
	(0.062)	(0.059)	(0.054)	(0.059)	(0.054)	(0.046)
× Dummy for Year 1990	0.165**	0.164**	0.203***	0.172***	0.202***	0.196***
	(0.067)	(0.065)	(0.062)	(0.062)	(0.060)	(0.048)
× Dummy for Year 2000	0.134**	0.132*	0.170***	0.138**	0.171***	0.174***
	(0.064)	(0.066)	(0.059)	(0.063)	(0.057)	(0.045)
× Dummy for Year 2010	0.122*	0.121*	0.153**	0.126**	0.155***	0.157***
	(0.063)	(0.067)	(0.061)	(0.062)	(0.056)	(0.045)
Pop. density 1940 × Year D.	No	Yes	No	No	Yes	Yes
GDP per capita 1940 × Year D.	No	No	Yes	No	Yes	Yes
Upper sec. school 1940 × Year D.	No	No	No	Yes	Yes	Yes
Weight (population)	No	No	No	No	No	Yes
Observations	1969	1969	1969	1969	1969	1969
Number of prefectures	44	44	44	44	44	44

The dependent variable is the local-newspaper circulation per household. The interaction terms with the other year dummies (1963–1968, 1971–1976, 1981–1989, 1991–1999, 2001–2009) are included in each regression but are omitted in the table due to limited space. Population size, prefecture dummies and year dummies are included in each specification. Robust standard errors clustered at the prefecture level are reported in parentheses.
* significant at 10%, ** significant at 5%, *** significant at 1%.

Table 3: Estimation results for national-newspaper circulations

	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for competitive market						
(Group 1)						
× Dummy for Year 1962	-0.078	-0.048	-0.059	-0.071	-0.050	-0.057
	(0.064)	(0.067)	(0.069)	(0.069)	(0.071)	(0.065)
× Dummy for Year 1970	-0.058	-0.033	-0.045	-0.059	-0.036	-0.041
	(0.069)	(0.073)	(0.070)	(0.074)	(0.076)	(0.074)
× Dummy for Year 1980	-0.052	-0.031	-0.046	-0.058	-0.035	-0.025
	(0.077)	(0.080)	(0.078)	(0.082)	(0.084)	(0.085)
× Dummy for Year 1990	-0.032	-0.014	-0.028	-0.037	-0.015	-0.009
	(0.074)	(0.079)	(0.076)	(0.079)	(0.082)	(0.082)
× Dummy for Year 2000	-0.028	-0.009	-0.025	-0.034	-0.011	-0.013
	(0.071)	(0.077)	(0.073)	(0.078)	(0.080)	(0.078)
× Dummy for Year 2010	-0.016	0.008	-0.012	-0.019	0.008	0.018
	(0.064)	(0.071)	(0.067)	(0.071)	(0.073)	(0.072)
Dummy for segmented market						
(Group 2)						
× Dummy for Year 1962	-0.092	-0.087	-0.074	-0.091	-0.092	-0.094
	(0.069)	(0.055)	(0.056)	(0.068)	(0.060)	(0.068)
× Dummy for Year 1970	-0.127*	-0.122**	-0.110*	-0.127*	-0.129**	-0.157**
	(0.070)	(0.055)	(0.058)	(0.069)	(0.058)	(0.060)
× Dummy for Year 1980	-0.185**	-0.180***	-0.174**	-0.186**	-0.192***	-0.226***
	(0.076)	(0.064)	(0.068)	(0.076)	(0.070)	(0.067)
× Dummy for Year 1990	-0.155**	-0.151**	-0.147**	-0.156**	-0.165**	-0.211***
	(0.076)	(0.066)	(0.070)	(0.076)	(0.073)	(0.068)
× Dummy for Year 2000	-0.148*	-0.144**	-0.143*	-0.150*	-0.162**	-0.210***
	(0.077)	(0.067)	(0.073)	(0.078)	(0.075)	(0.067)
× Dummy for Year 2010	-0.136*	-0.131**	-0.128*	-0.136*	-0.151**	-0.200***
	(0.079)	(0.064)	(0.071)	(0.079)	(0.072)	(0.066)
Pop. density 1940 × Year D.	No	Yes	No	No	Yes	Yes
GDP per capita 1940 × Year D.	No	No	Yes	No	Yes	Yes
Upper sec. school 1940 × Year D.	No	No	No	Yes	Yes	Yes
Weight (Population)	No	No	No	No	No	Yes
Observations	1975	1975	1975	1975	1975	1975
Number of prefectures	44	44	44	44	44	44

The dependent variable is the national-newspaper circulation per household. The interaction terms with the other year dummies (1963–1968, 1971–1976, 1981–1989, 1991–1999, 2001–2009) are included in each regression but are omitted in the table due to limited space. Population size, prefecture dummies and year dummies are included in each specification. Robust standard errors clustered at the prefecture level are reported in parentheses.
* significant at 10%, ** significant at 5%, *** significant at 1%.

Table 4: Estimation results for gubernatorial election turnout

	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for competitive market						
(Group 1)						
× Dummy for Year 1951	-0.005	-0.001	-0.002	-0.008	-0.003	-0.014
	(0.016)	(0.015)	(0.014)	(0.015)	(0.014)	(0.017)
× Dummy for Year 1963	-0.028	-0.015	-0.013	-0.034	-0.011	-0.000
	(0.034)	(0.034)	(0.032)	(0.035)	(0.032)	(0.038)
× Dummy for Year 1971	-0.021	-0.012	-0.021	-0.024	-0.015	-0.019
	(0.041)	(0.043)	(0.042)	(0.044)	(0.044)	(0.050)
× Dummy for Year 1983	0.059	0.071	0.056	0.058	0.067	0.044
	(0.047)	(0.052)	(0.051)	(0.050)	(0.054)	(0.055)
× Dummy for Year 1991	-0.025	-0.000	-0.019	-0.018	-0.000	-0.036
	(0.050)	(0.054)	(0.053)	(0.055)	(0.055)	(0.052)
× Dummy for Year 2003	0.002	0.022	0.008	0.011	0.025	0.003
	(0.041)	(0.044)	(0.043)	(0.042)	(0.045)	(0.045)
× Dummy for Year 2007	-0.002	0.012	0.002	0.007	0.019	0.053
	(0.029)	(0.032)	(0.029)	(0.029)	(0.033)	(0.043)
Dummy for segmented market						
(Group 2)						
× Dummy for Year 1951	-0.014	-0.014	-0.010	-0.016	-0.012	-0.007
	(0.022)	(0.022)	(0.021)	(0.022)	(0.021)	(0.022)
× Dummy for Year 1963	0.014	0.014	0.026	0.013	0.021	0.069*
	(0.039)	(0.041)	(0.039)	(0.039)	(0.039)	(0.038)
× Dummy for Year 1971	0.041	0.040	0.041	0.039	0.035	0.048
	(0.032)	(0.033)	(0.035)	(0.033)	(0.034)	(0.033)
× Dummy for Year 1983	0.100***	0.100***	0.096***	0.099***	0.088***	0.096***
	(0.032)	(0.030)	(0.033)	(0.033)	(0.032)	(0.032)
× Dummy for Year 1991	0.025	0.027	0.033	0.027	0.019	0.025
	(0.039)	(0.036)	(0.038)	(0.038)	(0.037)	(0.036)
× Dummy for Year 2003	0.048	0.048	0.055	0.050	0.046	0.056
	(0.043)	(0.043)	(0.043)	(0.041)	(0.043)	(0.043)
× Dummy for Year 2007	0.074*	0.074**	0.079**	0.077**	0.075**	0.081**
	(0.037)	(0.036)	(0.037)	(0.035)	(0.035)	(0.037)
Pop. density 1940 × Year D.	No	Yes	No	No	Yes	Yes
GDP per capita 1940 × Year D.	No	No	Yes	No	Yes	Yes
Upper sec. school 1940 × Year D.	No	No	No	Yes	Yes	Yes
Weight (population)	No	No	No	No	No	Yes
Observations	689	689	689	689	689	689
Number of prefectures	44	44	44	44	44	44

The dependent variable is gubernatorial election turnout rates. The interaction terms with the other year dummies (1955, 1959, 1967, 1975, 1979, 1987, 1995, 1999) are included in each regression but are omitted in the table due to limited space. Population size, prefecture dummies and year dummies are included in each specification. Robust standard errors clustered at the prefecture level are reported in parentheses.

* significant at 10%, ** significant at 5%, *** significant at 1%.

Table 5: Estimation results for lower-house election turnout

	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for competitive market						
(Group 1)						
× Dummy for Year 1952	-0.017	-0.009	-0.010	-0.013	-0.008	-0.011
	(0.014)	(0.012)	(0.012)	(0.014)	(0.013)	(0.013)
× Dummy for Year 1960	-0.013	-0.001	-0.002	-0.008	0.000	-0.002
	(0.017)	(0.014)	(0.014)	(0.017)	(0.014)	(0.015)
× Dummy for Year 1972	-0.001	0.013	0.008	0.004	0.015	0.013
	(0.020)	(0.015)	(0.017)	(0.020)	(0.016)	(0.022)
× Dummy for Year 1980	-0.007	0.001	-0.003	-0.004	0.003	0.002
	(0.018)	(0.018)	(0.017)	(0.019)	(0.020)	(0.019)
× Dummy for Year 1990	-0.013	-0.002	-0.009	-0.010	-0.001	0.001
	(0.017)	(0.016)	(0.016)	(0.018)	(0.017)	(0.019)
× Dummy for Year 2000	-0.005	0.001	-0.003	-0.001	0.005	0.002
	(0.020)	(0.021)	(0.019)	(0.021)	(0.023)	(0.022)
× Dummy for Year 2009	-0.009	-0.007	-0.011	-0.009	-0.004	-0.003
	(0.016)	(0.018)	(0.016)	(0.017)	(0.020)	(0.019)
Dummy for segmented market						
(Group 2)						
× Dummy for Year 1952	0.014	0.016	0.022	0.015	0.019	0.020
	(0.017)	(0.015)	(0.015)	(0.016)	(0.015)	(0.015)
× Dummy for Year 1960	0.032	0.035**	0.045***	0.034*	0.039***	0.039**
	(0.019)	(0.015)	(0.014)	(0.018)	(0.014)	(0.015)
× Dummy for Year 1972	0.042*	0.045**	0.053***	0.044**	0.045**	0.052**
	(0.022)	(0.018)	(0.019)	(0.021)	(0.018)	(0.022)
× Dummy for Year 1980	0.027	0.028	0.032*	0.028	0.027	0.037*
	(0.019)	(0.018)	(0.019)	(0.018)	(0.018)	(0.020)
× Dummy for Year 1990	0.029	0.031*	0.034*	0.030	0.026	0.030
	(0.019)	(0.016)	(0.018)	(0.018)	(0.016)	(0.019)
× Dummy for Year 2000	0.035	0.037	0.039	0.037	0.034	0.045*
	(0.024)	(0.024)	(0.024)	(0.023)	(0.023)	(0.024)
× Dummy for Year 2009	0.035*	0.035*	0.034*	0.035*	0.032	0.041*
	(0.020)	(0.020)	(0.020)	(0.020)	(0.019)	(0.022)
Pop. density 1940 × Year D.	No	Yes	No	No	Yes	Yes
GDP per capita 1940 × Year D.	No	No	Yes	No	Yes	Yes
Upper sec. school 1940 × Year D.	No	No	No	Yes	Yes	Yes
Weight (population)	No	No	No	No	No	Yes
Observations	1012	1012	1012	1012	1012	1012
Number of prefectures	44	44	44	44	44	44

The dependent variable is lower-house election turnout rates. The interaction terms with the other year dummies (1949, 1953, 1955, 1958, 1963, 1967, 1969, 1976, 1979, 1983, 1986, 1993, 1996, 2003, 2005) are included in each regression but are omitted in the table due to limited space. Population size, prefecture dummies and year dummies are included in each specification. Robust standard errors clustered at the prefecture level are reported in parentheses.
* significant at 10%, ** significant at 5%, *** significant at 1%.

Table 6: Estimation results for upper-house election turnout

	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for competitive market						
(Group 1)						
× Dummy for Year 1950	-0.001	0.004	0.002	0.004	0.006	-0.008
	(0.019)	(0.018)	(0.019)	(0.019)	(0.019)	(0.016)
× Dummy for Year 1962	-0.006	0.006	0.005	0.000	0.009	0.002
	(0.026)	(0.023)	(0.025)	(0.025)	(0.024)	(0.023)
× Dummy for Year 1971	-0.004	0.014	0.009	0.003	0.017	0.003
	(0.028)	(0.021)	(0.025)	(0.027)	(0.023)	(0.027)
× Dummy for Year 1980	-0.009	0.001	-0.002	-0.006	0.005	0.004
	(0.023)	(0.023)	(0.023)	(0.024)	(0.025)	(0.026)
× Dummy for Year 1992	0.002	0.021	0.007	0.004	0.020	0.014
	(0.028)	(0.024)	(0.026)	(0.028)	(0.024)	(0.023)
× Dummy for Year 2001	-0.011	-0.002	-0.007	-0.009	0.001	-0.004
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.025)
× Dummy for Year 2010	-0.005	0.004	-0.001	-0.002	0.009	0.007
	(0.023)	(0.024)	(0.023)	(0.024)	(0.026)	(0.027)
Dummy for segmented market						
(Group 2)						
× Dummy for Year 1950	0.027	0.027	0.031*	0.029*	0.025	0.025
	(0.018)	(0.017)	(0.018)	(0.016)	(0.016)	(0.016)
× Dummy for Year 1962	0.051**	0.052**	0.065***	0.053**	0.058**	0.065***
	(0.025)	(0.023)	(0.022)	(0.025)	(0.023)	(0.021)
× Dummy for Year 1971	0.041*	0.044*	0.057**	0.043*	0.046**	0.058**
	(0.024)	(0.022)	(0.021)	(0.024)	(0.022)	(0.024)
× Dummy for Year 1980	0.032	0.033	0.041*	0.033	0.034	0.041
	(0.023)	(0.022)	(0.023)	(0.023)	(0.023)	(0.026)
× Dummy for Year 1992	0.033	0.035	0.039	0.033	0.023	0.033
	(0.032)	(0.028)	(0.031)	(0.032)	(0.028)	(0.033)
× Dummy for Year 2001	0.042*	0.043*	0.047*	0.043*	0.040*	0.048*
	(0.023)	(0.023)	(0.023)	(0.023)	(0.022)	(0.025)
× Dummy for Year 2010	0.038	0.038	0.043*	0.039	0.037	0.044
	(0.024)	(0.024)	(0.025)	(0.025)	(0.024)	(0.030)
Pop. density 1940 × Year D.	No	Yes	No	No	Yes	Yes
GDP per capita 1940 × Year D.	No	No	Yes	No	Yes	Yes
Upper sec. school 1940 × Year D.	No	No	No	Yes	Yes	Yes
Weight (population)	No	No	No	No	No	Yes
Observations	967	967	967	967	967	967
Number of prefectures	44	44	44	44	44	44

The dependent variable is upper-house election turnout rates. The interaction terms with the other year dummies (1953, 1956, 1959, 1965, 1968, 1974, 1977, 1983, 1986, 1989, 1995, 1998, 2004, 2007) are included in each regression but are omitted in the table due to limited space. Population size, prefecture dummies and year dummies are included in each specification. Robust standard errors clustered at the prefecture level are reported in parentheses.
* significant at 10%, ** significant at 5%, *** significant at 1%.