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The Branch Service and the Business Performance of Shinkin Banks - Kyushu Region in Japan -[†]

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Abstract

This research investigates the effects of financial service quantity provided by a brick-and-mortar branch on the business performance of Shinkin banks by using an alternative way to measure the quantity. Even if the number of branches per unit area is the same between two areas, the branch service measure should indicate the larger value for the area with the larger population than the other. Since the effects of the resident population have not been necessarily embedded in the measure proposed by the existing studies, I presented alternative measures in my previous study. In this research these are adopted to explain the business performance of Shinkin banks in Kyushu region in Japan.

Keywords: Branch service measure, Shinkin banks, deposit, lending
JEL Codes: G21, R29, D22

1. Introduction

Brick-and-mortar branches have been decreasing in Japan since the 1990s because of bankruptcy of some financial institutions, consolidation based on the management strategy and decrease in population in rural regions. Thereafter, several regional banks which succeeded to improve their business performance began establishing new branches in the territories of the others. The number of branches became more different between regions.

Horiuchi and Sasaki (1982) defined the measure of branch services in a region as the product of the number of branches per household in a region and the population density. However, the values of the measure calculated with the municipal data at October 1, 2008 completely correlated with the number of branches per habitable land size for all the categories of financial institutions. The values of most municipalities are zero or extremely small because the measure of Horiuchi and Sasaki (1982) does not include

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the factor of population or the number of establishments in a region. Therefore, an alternative measure will be calculated that includes both the factors of the number of branches per unit size of habitable land and the population divided by the number of branches. The answer to the question why the branch services should be measured is based on the two sides of the financial services market.

One side is accessibility of consumers. In the United States, the way to improve consumers' accessibility to banking services is introducing a new bank under the branching restrictions. But it is not efficient on the basis of cost because economies of scale exist in the financial service industry. Evanoff (1988) tests the impact of branching on the accessibility of banking services. He measures the accessibility as the number of branching offices per square mile. Singh (2008) analyzes the response of customers in the small scale industries about the quality of service provided through branches by the public sector banks in India. The location of branch is counted as one of the factors to determine the level of customer service and satisfaction. Liu and Wu (2009) also point out that locational convenience is considered significantly important in traditional banking products. Ioannou et al. (2002) and Grigoroudis et al. (2002) investigate the optimization of the branch network for consumers and customer satisfaction in the banking services market, respectively.

The other side is efficiency of producers. Evanoff (1988), Al-Tami and Lootah (2007), and many other studies deal with issues on the cost efficiency or the profitability of financial institutions. After the Internet came into wide use, the cost efficiency of PC banking or online banking is included among the objects of research. Byers and Lederer (2001) theoretically compare the traditional banking and the PC banking strategy.

One of the other issues is the branching restrictions and their removals, as seen in Calem and Nakamura (1998) and Avery et al. (1999).

Papias and Ganesan (2010) point out that the accessibility to financial services is notably different between urban and rural areas especially in the developing countries. Although Japan Post Bank, privatized postal bank, and the agricultural cooperatives are the principal providers of financial services in rural areas in Japan, the accessibility to services of commercial banks is lower than in urban areas as yet.

The paper is organized in the following manner. Section 2 reviews original and alternative measures of financial services. Section 3 explains the data used for the empirical studies. Section 4 presents the empirical results and Section 5 discusses them. The final section contains a brief conclusion.

2. Measure of branch services

Horiuchi and Sasaki (1982) defined their original measure of financial services provided by branches of financial institutions as Eq. (1).

$$OMBS = N * B / H \quad (1)$$

where $OMBS$, N, B, and H denote the measure of financial services, population density, the number of branches, and the number of households in a region, respectively[1]. This measure of branch services is controversial. That is, it is proportional to the branch density, the number of branches per unit area, if the number of family member is identical among households. However, Horiuchi and Sasaki (1982) estimate by using the data of population density for densely inhabited districts as well as ordinary one in order to control the effects of population. They show that the outstanding amount of deposits in a prefecture positively relate to the branch services provided by financial institutions with the cross-sectional data model including their measure of branch services.

The branch density defined as the number of branches per unit area is an important factor of the measure of the branch services because it proxies the accessibility for residents to a branch if they are uniformly distributed in a region. Another factor is the population in a region. It is recognized that a branch can have opportunities to provide financial service if the population is larger. Therefore, the resident population per branch will be considered.

An alternative measure of branch services BS_0 is defined as Eq. (2).

$$BS_0 = f(B/A)g(P/B) \quad (2),$$

where $f(B/A)$ and $g(P/B)$ illustrate the factors of the branch density and the resident population per branch, respectively. A logarithmic function is suggested as a functional form of f(・) and g(・) because of tractability.

$$BS_0 = f(B/A)g(P/B) \equiv \ln(B/A)\ln(P/B) \quad (3)$$

Whether the measure of (3) rises up as increase in branch depends on the scale of the variable. That is, for some A>0 and P>0, it is not guaranteed that BS_0 is increasing to B. In practice, it is clear that the first derivative of (3) with respect to B is positive when the scale of area is square kilometer and the scale of population is the number of residents as seen in (4).

$$dBS_0 / dB = (\ln A + \ln P - 2\ln B)/B \quad (4)$$

When the municipal data are used, the more fundamental problem is that the number of branches B becomes zero in some regions and the measure BS_0 diverges. In such a case, the Box-Cox transformation, the general form of logarithm, is sometimes

[1] The notation is not the same as that in their original paper.

used to remove the problem. Since the number of branches can become zero, the number of branches per resident is used in spite of P/B. Inserting the parameters λ_1 and λ_2 into the measure, the general form of (3) is represented by (5).

$$BS_1 = \left\{(1/\lambda_1)\left((B/A)^{\lambda_1} - 1\right)\right\}\left\{(1/\lambda_2)\left((B/P)^{\lambda_2} - 1\right)\right\}, \quad \lambda_1, \lambda_2 \in (0,1) \qquad (5)$$

Section 4 will examine whether these alternative measures of financial services are effective to explain the business performance of financial institutions. The next section introduces the data used for analysis prior to the empirical studies.

3. Data and Preliminaries

Since business areas of a Shinkin bank are strictly regulated and narrower than that of a regional bank in general, economic and demographic factors which are specific to the area affect its business performance more clearly. The data chosen for our empirical studies are concerned to the Shinkin banks in Kyushu region because their activities are separated from the other regions. That is, Kyushu region is an island including seven prefectures where twenty-eight Shinkin banks do business[2]. Their basic information is described in Table 1 and Table 2.

[2] Only Fukuoka Hibiki is permitted to bank in Shimonoseki which is a city outside Kyushu region.

Table 1 Profile of Twenty-eight Shinkin Banks

Prefecture	Name	Head offiece City (ward)	Business area in Prefecture
Fukuoka	Fukuoka	Fukuoka (Chuo)	Partial
	Fukuoka Hibiki	Kitakyushu (Yahata)	Partial (Yamaguchi, Oita)
	Omuta Yanagawa	Omuta	Whole (Saga)
	Chikugo	Kurume	Whole (Saga)
	Iizuka	Iizuka	Whole
	Tagawa	Tagawa	Partial
	Okawa	Okawa	Whole (Saga)
	Onga	Mizumaki*	Whole
Saga	Karatsu	Karatsu	Whole (Fukuoka)
	Saga	Saga	Whole (Fukuoka)
	Imari	Imari	Whole (Nagasaki)
	Kyushu Hizen	Takeo	Whole (Nagasaki)
Nagasaki	Tachibana	Isahaya	Partial
Kumamoto	Kumamoto	Kumamoto	Partial
	Kumamoto Daiichi	Kumamoto	Partial
	Kumamoto Chuo	Kumamoto	Partial (Fukuoka, Kagoshima)
	Amakusa	Amakusa	Partial
Oita	Oita	Oita	Partial
	Oita Mirai	Beppu	Partial (Fukuoka)
	Hita	Hita	Partial (Kumamoto)
Miyazaki	Miyazaki	Miyazaki	Partial
	Miyakonojo	Miyakonojo	Partial (Kagoshima)
	Nobeoka	Nobeoka	Partial
	Takanabe	Takanabe*	Partial (Kagoshima)
	Nango	Nichinan	Partial
Kagoshima	Kagoshima	Kagoshima	Partial
	Kagoshima Sogo	Kagoshima	Partial (Miyazaki)
	Amami Oshima	Amami	Partial

Note: The information is as of March 31, 2013. * denotes county.

Table 2 Basic Business Information

Name	No. of branches	Membership	No. of employee	Outstanding deposits (milion JPY)	Outstanding lendings (milion JPY)	Net business profits* (milion JPY)	Own capital ratio* (%)	Bad debt ratio* (%)
Fukuoka	15	11,452	163	106,030	60,166	242	10.04	8.35
Fukuoka Hibiki	51	73,043	614	630,598	320,407	3,874	13.98	6.41
Omuta Yanagawa	14	14,795	203	170,068	87,599	630	13.41	6.56
Chikugo	13	11,296	205	141,182	89,523	714	18.64	3.31
Iizuka	19	15,259	206	212,174	125,054	1,496	14.47	8.57
Tagawa	9	6,265	94	56,700	29,085	155	8.23	9.29
Okawa	11	10,622	146	113,325	59,636	417	19.96	10.96
Onga	15	16,128	209	179,682	112,481	1,623	14.31	5.44
Karatsu	9	8,394	111	71,009	39,287	240	8.27	9.51
Saga	14	10,737	153	109,226	58,268	281	14.32	5.89
Imari	8	5,827	95	65,725	44,574	264	12.96	7.21
Kyushu Hizen	19	15,812	189	119,827	75,469	356	9.96	7.89
Tachibana	15	15,575	192	107,139	70,698	350	7.44	8.73
Kumamoto	19	18,754	193	137,897	73,135	337	10.32	6.04
Kumamoto Daiichi	24	23,122	280	257,620	155,056	1,388	7.84	7.79
Kumamoto Chuo	19	25,467	211	157,882	82,880	639	8.45	7.72
Amakusa	11	22,028	132	116,988	62,939	731	19.00	9.78
Oita	27	30,628	222	202,597	85,744	955	22.74	9.27
Oita Mirai	36	40,676	429	344,505	173,159	1,281	13.71	6.89
Hita	7	5,093	71	40,202	18,006	120	9.61	9.73
Miyazaki	11	12,234	115	68,842	44,857	117	8.44	6.15
Miyakonojo	10	8,290	76	48,180	23,402	23	7.04	6.20
Nobeoka	8	9,418	80	52,661	25,574	142	12.35	3.55
Takanabe	24	37,000	282	219,610	96,898	997	10.26	10.27
Nango	11	14,123	118	73,045	33,715	115	15.20	8.74
Kagoshima	44	44,199	463	289,304	187,424	1,266	7.67	6.09
Kagoshima Sogo	60	89,335	707	505,061	331,012	2,209	7.43	4.87
Amami Oshima	15	15,604	120	74,520	49,310	170	14.02	6.44

Note: * indicates that the figures are the average of the values in 2011, 2012, and 2013. The number of branches is as of September 30, 2013 and the source of it is from "Nihon Kin-yu Meikan 2014" edited by Japan Financial News Co., Ltd. The other figures are as of March 31, 2013 and the source of it is from the site of Financial Service Agency.

Most business results are so proportion to the firm size that the correlation coefficients between the values concerning to business performance in Table 2 are considerably high. It can be seen in Table 3. Therefore, the values divided by the number of branches will be used in following empirical studies.

Table 3 Correlation Coefficients

	Membership	No. of employee	Outstanding deposits	Outstanding lendings	Net business profits
No. of branches	0.965	0.982	0.936	0.951	0.814

The demographic and economic data cited in Table 4 consist of population, the

number of households, the size of an area, the number of establishments, and the number of branches of financial institutions[3]. Although Table 4 illustrates there are several towns and villages in which no branches of financial institutions, multi-purpose organizations such as post offices and agricultural cooperatives provide financial services through their branches there.

Table 4 Descriptive Statistics for Municipalities

			Ward	City	Town	Village	Total
No. of municipalities			14	105	108	18	245
Population[(a)]		Max	365,990	757,093	42,860	11,273	
		Min	73,100	16,501	2,850	420	
		Mean	188,676	84,971	14,666	2,905	
		Std.	87,255	116,840	8,981	2,511	
No. of households		Max	133,165	302,413	17,619	4,610	
		Min	28,064	7,100	1,287	242	
		Mean	80,576	33,781	5,820	1,152	
		Std.	34,103	47,796	3,726	955	
Area (km^2)		Max	170.9	903.5	544.8	537.4	
		Min	15.2	14.2	5.7	6.9	
		Mean	59.2	271.2	95.7	141.9	
		Std.	40.9	204.4	100.0	121.2	
No. of establishments[(b)]		Max	17,930	17,206	783	192	
		Min	1,341	311	42	1	
		Mean	4,943.6	1,677.8	253.2	47.9	
		Std.	4,481.5	2,716.1	421.8	46.9	
No. of branches	Total[(c)]	Max	69	146	9	1	
		Min	9	2	0	0	
		Mean	28.7	16.6	2.5	0.1	
		Std.	18.10	25.17	1.61	0.31	
	Shinkin banks	Max	12	42	3	0	
		Min	1	0	0	0	
		Mean	4.3	4.1	0.6	0.0	
		Std.	2.71	6.98	0.70	0.00	

Note: (a) Each figure is day population. (b) Each figure is the number of establishments of corporations. (c) The total financial institutions include commercial banks, Shinkin banks, credit unions, and labor banks.

Source: The data for population, the number of households, and the size of a municipality are from the 2010 National Census of Japan. The number of establishments is from the 2012

[3] Five wards compose Kumamoto city since it became a designated city on April 1, 2012. However, not all the data have been available by ward yet, so they are aggregated in this analysis.

Economic Census for Business Activity. The number of branches is as of September 30, 2013 and the source of it is from “Nihon Kin-yu Meikan 2014” edited by Japan Financial News Co., Ltd.

As seen in Table 2 and Table 4, even though the business area of a Shinkin bank is a whole prefecture, it does not locate its branches in all municipalities there. Therefore, the business area of a Shinkin bank is redefined as a union of municipalities in which no less than one branch of the institution is located. For instance, population of the i-th Shinkin bank’s business area is indicated by Eq. (6).

$$P_i = \sum_{j=1}^{n} \delta_{ij} p_j \tag{6}$$

where P_i is population of the i-th Shinkin bank’s business area, p_j is population of the j-th municipality, and δ_{ij} defined as follows.

$$\delta_{ij} = \begin{cases} 0 & b_{ij} = 0 \\ 1 & b_{ij} \neq 0 \end{cases} \tag{7}$$

where b_{ij} is the number of branches of the i-th Shinkin bank in the j-th municipality. The number of households and establishments in a Shinkin bank’s business area is defined in the same manner as well as the size of business area.

Finally, the branch share of the i-th Sinkin bank, S_i, is simply defined as the rate of the number of its branches to the total in the business area.

$$S_i = \sum_{j=1}^{n} b_{ij} / \sum_{i=1}^{m} \sum_{j=1}^{n} \delta_{ij} b_{ij} \tag{8}$$

4. Empirical Studies

It will be examined here whether the outstanding deposits, the outstanding lendings, and the net business profits can be explained by the related variables including the branch service measures reviewed in Section 2. Regression equations (9), (10), and (11) are defined as follows.

$$DEPOSIT = \beta_0 + \beta_1 BRANCH + \beta_2 SHARE + \beta_3 MEMBER + \beta_4 EMPLOYEE \tag{9}$$

$$LEND = \beta_0 + \beta_1 BRANCH + \beta_2 SHARE + \beta_3 MEMBER + \beta_4 EMPLOEE + \beta_5 BAD + \beta_6 OCR \tag{10}$$

$$NBP = \beta_0 + \beta_1 BRANCH + \beta_2 SHARE + \beta_3 MEMBER + \beta_4 EMPLOEE + \beta_5 BAD + \beta_6 OCR \quad (11)$$

DEPOSIT : outstanding amount of deposits divided by the number of branches (million JPY)

BRANCH : branch service measure[4]

SHARE : share of the number of Shinkin bank's branches

MEMBER : membership divided by the number of branches

EMPLOYEE : the number of employee divided by the number of branches

LEND : outstanding amount of lendings divided by the number of branches (million JPY)

BAD : non-performing loan ratio

OCR : own capital ratio

NPB : net business profits divided by the number of branches (million JPY)

The OLS regression results for deposits, lendings, and net business profits by using the cross-sectional data of Shinkin banks are illustrated in Table 5, Table 6, and Table 7, respectively. The coefficients of three types of branch service measures are significantly positive in every table. Accordingly, the models suggest that the financial services through branches relates to Shinkin banks' deposits, lendings, and profits. Of course, a certain number of employees are distributed in each branch, so the average number of them relates to the independent variables.

As for the parameters in the measure of BS_1, $\lambda_1 = \lambda_2 = 0.1$ in the model of explaining deposits, and $\lambda_1 = 0.1$and $\lambda_2 = 0.01$ in the model of explaining lendings and net business profits. The effects of branch share are ambiguous and depend on these parameters. However, the higher the branch share is, the more the Shinkin bank can acquire deposits as seen in Table 5.

[4] The population is replaced by the number of establishments for regression of Eqs. (10) and (11).

Table 5 Deposits and Branch Service Measures

	OMBS	*BS0*	*BS1*
BRANCH	28232.2 **	99.8 **	1996.6 *
	(10437)	(47.2)	(1038.3)
SHARE	−640.7	4633.5 **	4439.8 *
	(2041.7)	(2175.8)	(2191.3)
MEMBER	1.9 ***	1.9 ***	1.8 ***
	(0.6)	(0.6)	(0.6)
EMPLOYEE	764.3 ***	786.8 ***	794.6 ***
	(133.2)	(131.8)	(133.1)
const.	−3485.7 **	−13334.3 ***	−9281.8 ***
	(1349.6)	(4347.3)	(2874.5)
Adj-R2	0.7237	0.6949	0.6878
RMSE	1233.4	1295.9	1310.9

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Robust standard errors are in parentheses.

Table 6 Lendings and Branch Service Measures

	OMBS	BS_0	BS_1
BRANCH	11951.1 *	70.2 *	28485.3 *
	(6718.3)	(40.5)	(16450.6)
SHARE	−769.2	3213.7	2200.1
	(1450.1)	(1942.3)	(1588.9)
MEMBER	0.2	0.2	0.2
	(0.5)	(0.4)	(0.4)
EMPLOYEE	545.9 ***	558.1 ***	556.5 ***
	(84.2)	(74.4)	(75.9)
BAD	−79	−103.8	−98.3
	(72)	(71)	(70.7)
OCR	52	56.1 *	54.6 *
	(30.3)	(30.5)	(30.5)
const.	−2097.8 *	−6708.1 **	−5251.5 ***
	(1014.5)	(2500.1)	(1737.3)
Adj-R2	0.7015	0.7235	0.7203
RMSE	868.84	836.14	840.98

Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Robust standard errors are in parentheses.

Table 7 Net Business Profits and Branch Service Measures

	OMBS	BS_0	BS_1
BRANCH	11951.1 *	70.2 *	28485.3 *
	(6718.3)	(40.5)	(16450.6)
SHARE	−769.2	3213.7	2200.1
	(1450.1)	(1942.3)	(1588.9)
MEMBER	0.2	0.2	0.2
	(0.5)	(0.4)	(0.4)
EMPLOYEE	545.9 ***	558.1 ***	556.5 ***
	(84.2)	(74.4)	(75.9)
BAD	−79	−103.8	−98.3
	(72)	(71)	(70.7)
OCR	52	56.1 *	54.6 *
	(30.3)	(30.5)	(30.5)
const.	−2097.8 *	−6708.1 **	−5251.5 ***
	(1014.5)	(2500.1)	(1737.3)
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Notes: ***, ** and * denote significance at the 1%, 5%, and 10% levels. Robust standard errors are in parentheses.

5. Discussion

The empirical analysis in the previous section insists that the branch services defined as financial services provided through brick-and-mortar branches of institutions significantly relate to their deposits, lendings, and net business profits. OMBS, the original measure of branch services, was statistically significant in all three cases. On the other hand, the alternative measures proposed in this paper made two variables significant. The own capital ratio is positively significant in the cases of lendings and net business profits. The branch share is so in the case of deposits.

If the efficiency of business transactions is defined as the profits per branch, the most efficient bank is Onga. Its net business profits per branch are 108.2 million JPY on average from FY 2010 through FY 2012. The amount is 29.5 million JPY more than that of Iizuka which earned the second largest profits per branch on average. The relationships between profits and branch service measure are depicted in Figure 1-3.

Since OMBS is proportional to the number of branches per unit area, the value of Omuta Yanagawa which locates their branches in smaller cities is the highest. Although Fukuoka Shinkin's branch service measure is considerably high, the average net business profits are low as seen in Figure 2 and Figure 3. This is probably caused by a temporary decline of profits in FY 2011 and the stiff competition. Its headquarters are located in Fukuoka city, which is the metropolitan area in Kyushu region, so a large

number of financial institutions including city banks and regional banks are competing there. Fukuoka Shinkin had 113 billion JPY total assets and 163 employees in the end of FY 2012. Its business scale is so smaller than commercial banks that it must compete under the hard conditions. The situation is the same as Kumamoto Shinkin.

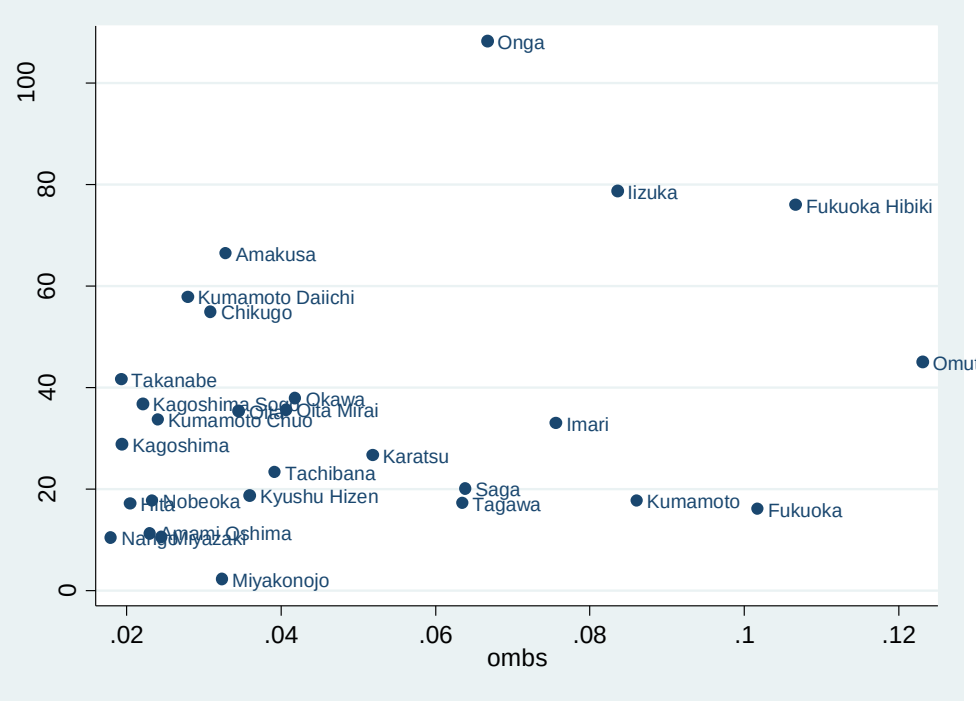

Figure 1 Profits and OMBS

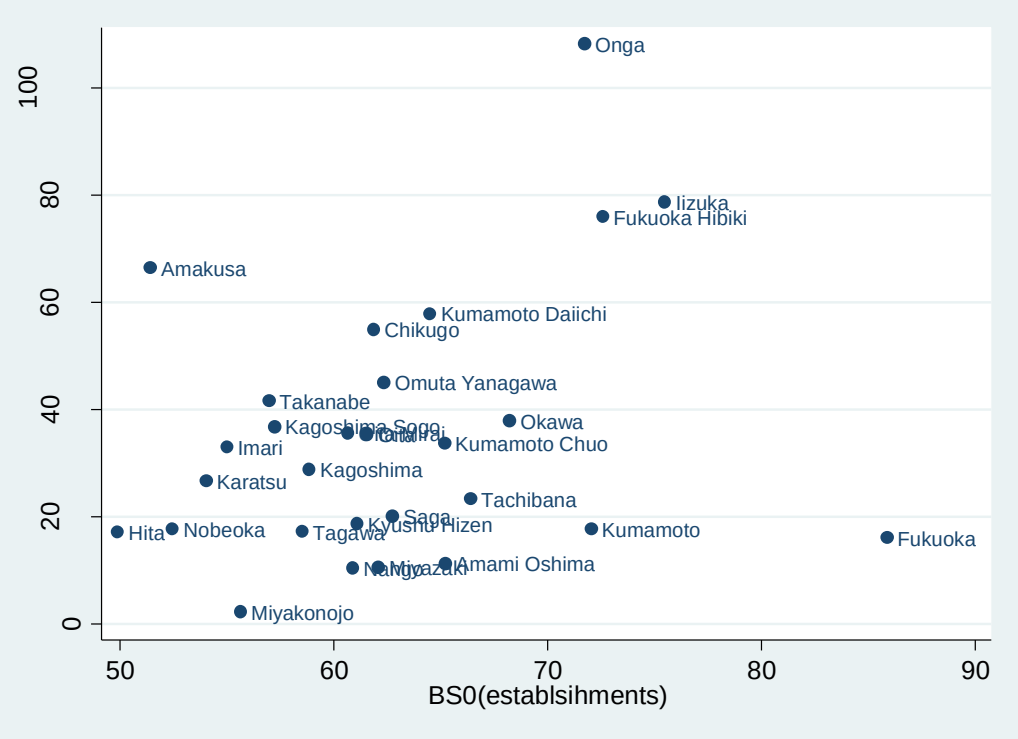

Figure 2 Profits and BS_0

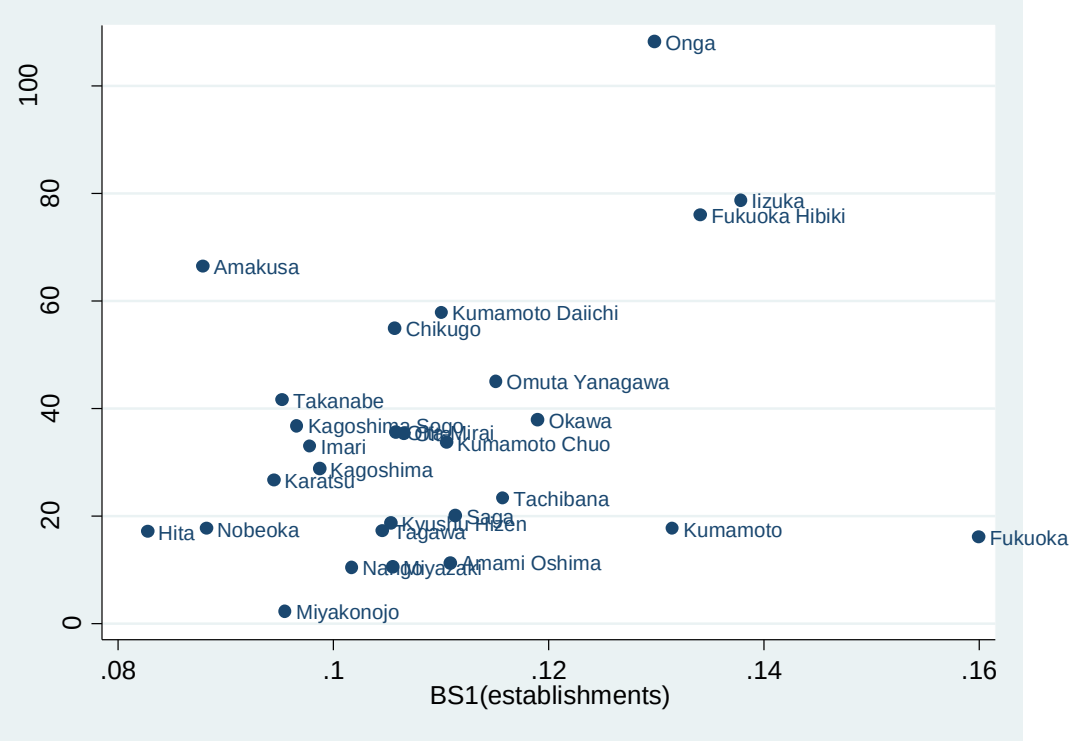

Figure 3 Profits and BS_1

It is natural that continuing business in competing area is hard for institutions. However, an institution whose branch share is higher does not necessarily earn higher profits. The dots of Onga, Iizuka, and Fukuoka Hibiki are scattered in the north-west area of the plane in Figure 4. On the other hand, a higher branch share group consists of Karatsu, Amakusa, Imari, Tagawa, Hita, Nobeoka, Omuta Yanagawa, and Miyakonojo whose net business profits per branch are various[5].

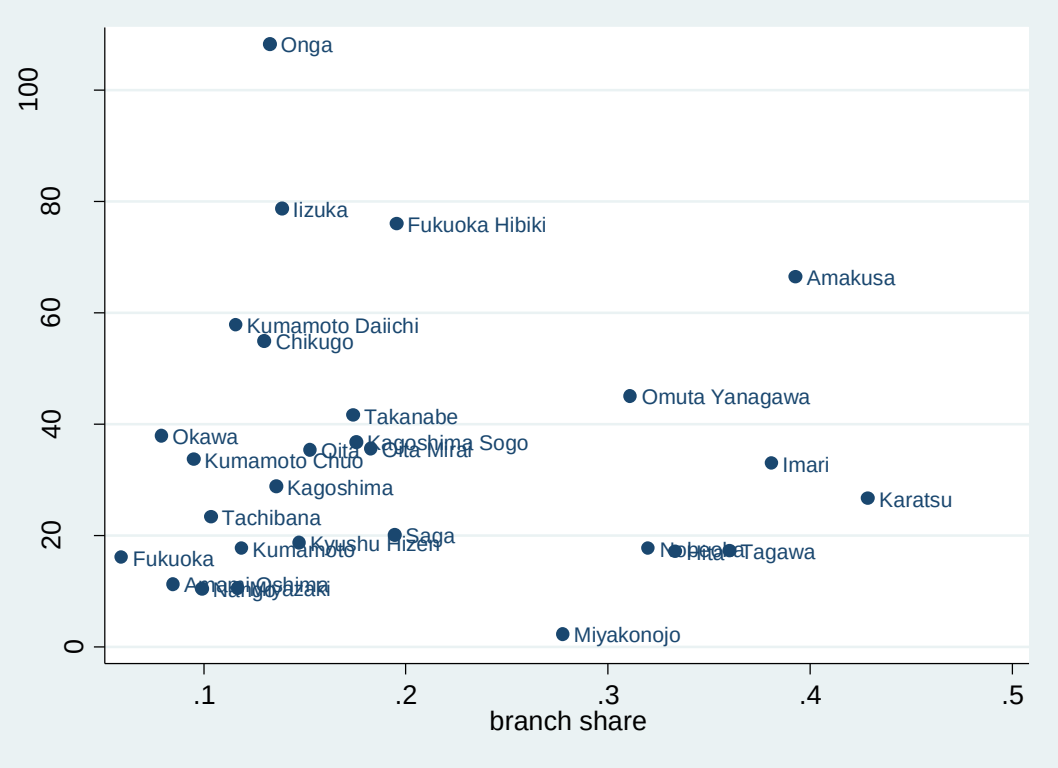

Figure 4 Profits and Branch Share

The common feature between Onga, Iizuka, and Fukuoka Hibiki is that they locate their branches in densely populated areas. In our analysis the business area of each Shinkin bank is defined as the union of the municipalities in which its branches are located. Accordingly, the population density is calculated for those areas. The scattered diagram illustrates the relationship between profits and population density in Figure 5. The value of population density for Onga follows that for Fukuoka and those for Iizuka and Fukuoka Hibiki are considerably higher.

In general, the profits of financial institutions may be more strongly affected by

[5] Miyakonojo's net business profits were negative in FY 2011 as well as ordinary income because of increase in allowances for bad debt and the write-down of the values of properties holdings.

density of firm establishments than that of households. However, regression coefficient of neither population density nor "establishment density" is not statistically significant. Figure 6 depicts the relation between profits and the number of establishments per unit area.

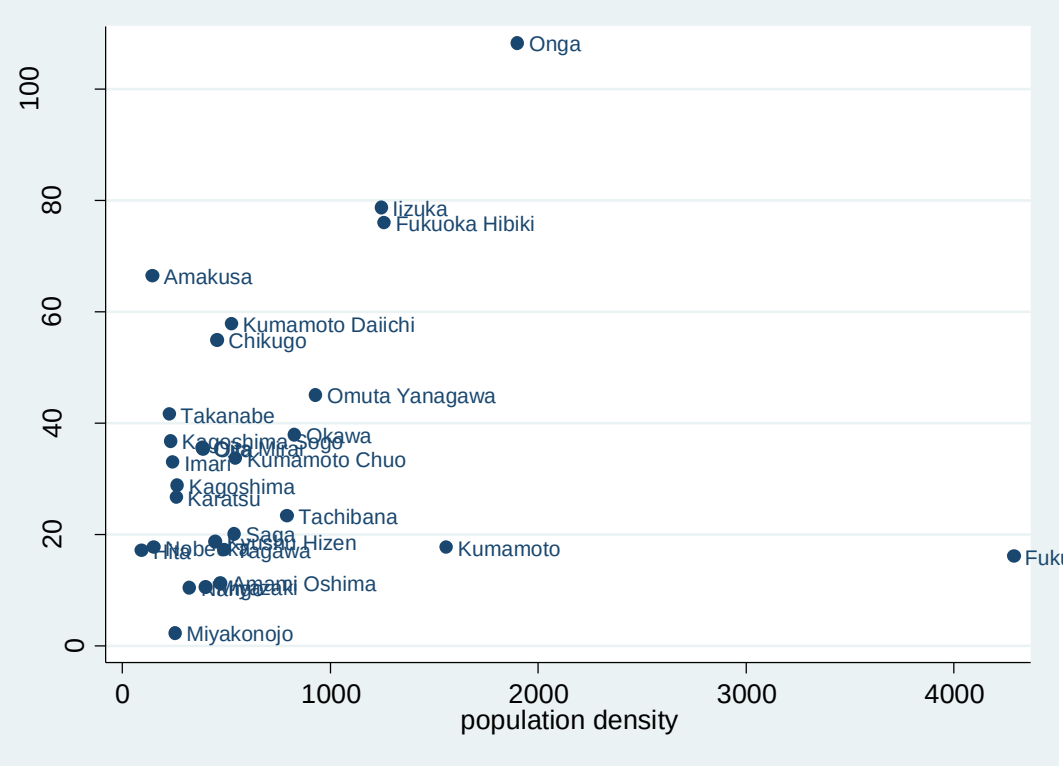

Figure 5 Profits and Population Density

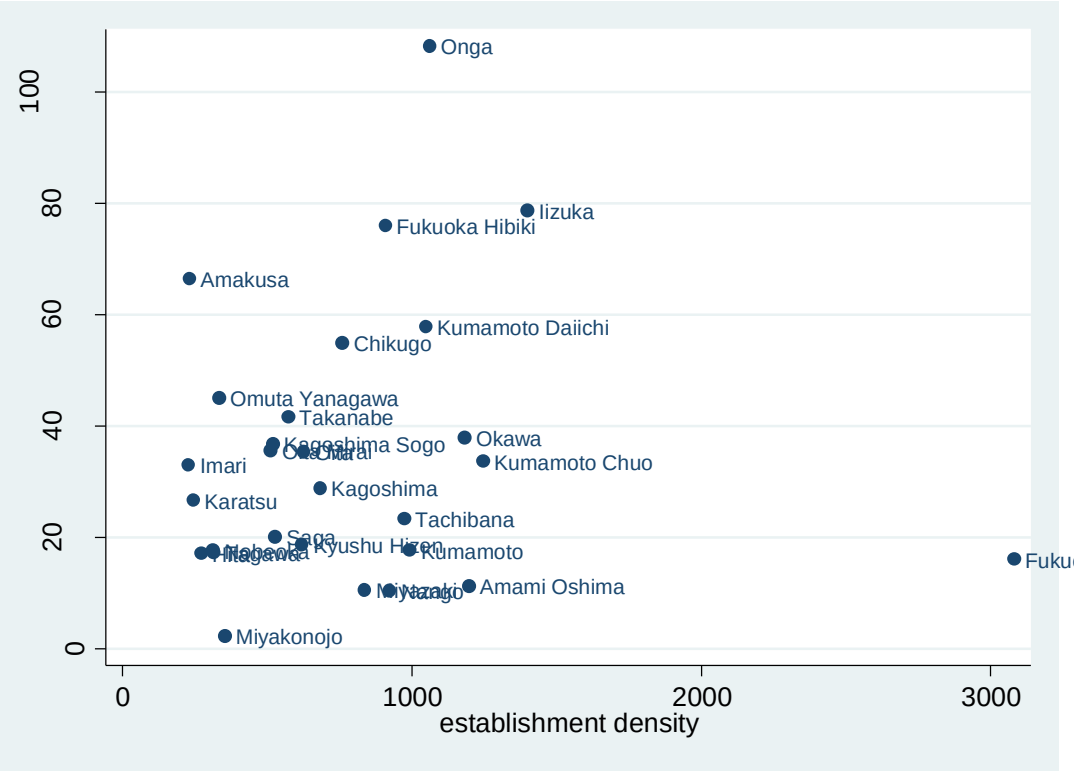

Figure 6 Profits and the Number of Establishments per Unit Area

6. Conclusion

In this research we investigate whether our alternative branch service measures can be applied to empirical analysis. If municipal data including financial statistics such as outstanding amount of deposits and lendings are available, the quantity of branch service calculated for each municipality will be more useful. Therefore, the business areas of a Shinkin bank are defined as the union of the areas in which no less than one branch is located. Although it is the secondary approach, the regression coefficients are statistically significant for all the equations.

The empirical analysis examined here is static, that is, it is ambiguous that a Shinkin bank can enhance its business performance by relocating its branches to increase the branch service quantity. The next step of our research is to collect the data for longer period and to examine the relationship between changes of business performance and the service provided through the branches.

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