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A factor analysis of business start-up rates in Japan: contemporary and historical context

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A factor analysis of business start-up rates in Japan: contemporary and historical context

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Abstract

This study analyzed the factors that determined the regional business start-up rates in Japan between 2012-2014, taking into account the influence of historical regional characteristics in addition to contemporary social and economic factors.

As for the industrial structure, regions where the ratio of service sectors is relatively high tend to have high start-up rates. Regarding the employment environment, unemployment tends to promote business start-ups. In addition, there was a tendency for the business start-up rate to increase with a high ratio of foreigners, but a relatively high proportion of highly educated personnel had no effect.

Regarding the influence of historical characteristics on business start-up behavior, two conflicting directions were recognized. In regions focused on rice production, business start-up behavior has historically been suppressed. In contrast, in recent years there has been a tendency to promote business start-ups in areas in which the ratio of rice cultivation is high, reflecting changes in agricultural policies, such as incentives for corporations to enter agriculture and support for conversion from individual farmer to corporate management.

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JEL: M13, O13, O18, R11

Key words: business start-ups, industrial structure, historical context, agriculture

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1. Introduction

It has been a long time since the problem of low business start-up rates in Japan in comparison to Western countries has been raised. The Abe administration's growth strategy has set the goal of increasing the business start-up rate to approximately 10%, which is comparable to that of the United States and Europe, and policies that are supportive to entrepreneurs have been developed accordingly.

Since the beginning of the 1990s, the business start-up rate has been less than the exit rate in Japan. Along with this, empirical research has been gradually conducted since the 1990s on what elements would promote/suppress new establishments, with the aim of providing basic information for creating suitable environments for new establishments (Yamawaki [1991], Kutsuna [1995], Yoshimura [2000], Kobayashi [2004], Okamuro and Kobayashi [2006]). Through these studies, the factors that determine the rate at which businesses are opened in the regions of Japan, and the similarities and differences with Western countries, have---to some extent---been clarified.

Turning now to the regional characteristics, the business start-up rate in Japan is characterized by the fact that relatively high regions are persistently high, while low regions are consistently low. In other words, it is thought that the characteristics of the regional industry accumulation that has been formed historically have an impact on new start-up activities today. In Western countries, empirical research focusing on this historical background has been conducted, but previous studies in Japan which focused on historical context is relatively rare.

This study focuses on the historical path dependency of the business start-up rates in Japanese regions. In other words, the aim is to analyze the impact of contemporaneous economic environment on the promotion and restraint of business start-ups, as well as the historical context of regional industrial accumulation on today's new business start-up behavior.

2. Historical overview of regional business start-up rates

Table 1 shows the changes in the business start-up rate of each prefecture since 1972 (when Okinawa was returned to Japan), using economic census. As can be seen from this table, for example, Okinawa and Fukuoka are consistently relatively high in the start-up rate, namely, located in the top five places in the country throughout the period. Similar trends can be seen in Osaka (4th highest, 9th lowest), Kanagawa (3rd highest, 11th lowest). On the other hand, there are areas with consistently low start-up rates, such as Wakayama (38th highest and 47th lowest) and Fukui (39th highest and 47th

lowest).

Thus, there are regions where the start-up rate is relatively high or relatively low in Japan, and this trend is basically stable, although there are areas that show exceptional rise or falls. Table 2 shows the correlation matrix of the business start-up rate of each prefecture (shown in Table 1) at different time periods. Although 40 years have passed between the oldest period (1972-75) and the most recent period (2012-14), the correlation coefficient was high, at 0.57. In other words, regional characteristics, such as aggressiveness and cautiousness in relation to new establishments, have historically formed in each region, and have been basically stable for many years. What historical factors are affecting the business start-up rates in each region? In the next section, we will review the previous research on the factor analysis for regional entrepreneurship, with a particular focus on the historical background.

Table 1. Average annual business start-up rates and rankings of 47 prefectures (1972-2014)

	1972-75		75-78		78-81		81-86		86-91		91-96		96-2001		2001-06		2009-12		2012-14	
	rate	(rank)	rate	(rank)	rate	(rank)	rate	(rank)	rate	(rank)	rate	(rank)	rate	(rank)	rate	(rank)	rate	(rank)	rate	(rank)
Hokkaido	5.75	(4)	5.97	(4)	5.86	(5)	4.64	(2)	3.98	(3)	3.09	(7)	3.03	(11)	3.02	(5)	2.74	(9)	6.03	(13)
Aomori	5.46	(9)	5.57	(8)	5.46	(8)	4.06	(10)	3.16	(19)	2.79	(15)	2.85	(14)	2.47	(26)	1.98	(32)	5.41	(25)
Iwate	3.97	(26)	4.24	(26)	4.72	(19)	3.77	(19)	3.07	(26)	2.52	(28)	2.80	(15)	2.75	(15)	2.32	(21)	6.33	(9)
Miyagi	5.30	(10)	4.93	(14)	5.27	(10)	4.36	(8)	3.63	(9)	3.12	(5)	3.15	(7)	2.98	(7)	2.84	(7)	7.86	(2)
Akita	3.90	(30)	4.05	(31)	4.42	(25)	3.51	(30)	2.86	(38)	2.61	(22)	2.58	(27)	2.41	(28)	1.79	(43)	4.76	(42)
Yamagata	3.59	(34)	4.08	(30)	4.15	(34)	3.26	(39)	2.87	(37)	2.40	(34)	2.48	(32)	2.26	(37)	1.67	(46)	4.38	(46)
Fukushima	3.92	(29)	3.95	(33)	4.27	(30)	3.69	(22)	3.06	(27)	2.62	(21)	2.53	(30)	2.37	(30)	1.97	(34)	5.33	(28)
Ibaraki	3.89	(31)	4.23	(27)	4.50	(23)	3.63	(25)	3.05	(29)	2.60	(23)	2.57	(28)	2.54	(22)	1.94	(36)	5.06	(35)
Tochigi	4.04	(24)	4.12	(29)	4.36	(26)	3.41	(33)	3.00	(31)	2.45	(33)	2.43	(34)	2.35	(31)	1.98	(33)	5.09	(34)
Gunma	3.93	(28)	4.14	(28)	4.29	(29)	3.66	(23)	3.06	(28)	2.31	(37)	2.28	(44)	2.25	(38)	1.89	(40)	5.14	(33)
Saitama	5.73	(5)	5.66	(7)	5.79	(6)	4.62	(3)	3.82	(6)	3.00	(11)	2.98	(12)	2.76	(14)	2.60	(12)	6.20	(10)
Chiba	5.48	(8)	5.95	(5)	5.94	(4)	4.49	(5)	3.90	(4)	3.06	(9)	3.07	(10)	2.90	(12)	2.66	(11)	6.36	(8)
Tokyo	4.93	(12)	4.93	(13)	4.92	(17)	3.76	(20)	3.15	(22)	3.10	(6)	3.21	(4)	3.10	(4)	3.95	(1)	7.94	(1)
Kanagawa	5.68	(6)	5.40	(9)	5.26	(11)	4.41	(6)	3.85	(5)	3.20	(3)	3.26	(3)	2.95	(9)	3.32	(3)	6.88	(5)
Niigata	3.69	(33)	3.65	(38)	3.77	(40)	3.18	(42)	2.87	(36)	2.29	(39)	2.41	(37)	2.22	(41)	1.81	(42)	4.72	(44)
Toyama	3.38	(39)	3.22	(47)	3.22	(47)	2.94	(47)	2.63	(43)	2.31	(38)	2.36	(41)	2.17	(43)	1.69	(45)	4.81	(40)
Ishikawa	4.24	(22)	4.51	(23)	4.19	(33)	3.56	(29)	3.15	(20)	2.37	(36)	2.39	(38)	2.31	(34)	2.24	(26)	5.19	(31)
Fukui	3.24	(42)	3.49	(44)	3.28	(46)	3.04	(45)	2.61	(45)	2.10	(46)	2.05	(47)	1.96	(47)	1.67	(47)	4.82	(39)
Yamanashi	3.28	(41)	3.56	(43)	3.81	(39)	3.48	(32)	2.70	(41)	2.23	(41)	2.30	(42)	2.20	(42)	1.75	(44)	4.76	(41)
Nagano	3.46	(37)	3.62	(40)	3.84	(37)	3.37	(34)	2.77	(39)	2.48	(32)	2.42	(36)	2.24	(40)	1.96	(35)	5.27	(30)
Gifu	3.14	(44)	3.43	(45)	3.68	(42)	3.16	(43)	2.65	(42)	2.22	(42)	2.38	(39)	2.24	(39)	1.83	(41)	5.01	(36)
Shizuoka	4.29	(20)	4.25	(25)	4.34	(27)	3.57	(28)	3.15	(21)	2.54	(27)	2.62	(26)	2.34	(32)	2.06	(30)	5.61	(20)
Aichi	4.26	(21)	4.62	(22)	4.53	(22)	3.72	(21)	3.35	(14)	2.74	(17)	2.86	(13)	2.81	(13)	2.69	(10)	6.18	(11)
Mie	3.16	(43)	3.65	(39)	3.60	(44)	3.29	(37)	2.92	(35)	2.48	(31)	2.47	(33)	2.17	(44)	2.09	(29)	5.15	(32)
Shiga	3.07	(45)	3.61	(41)	3.84	(38)	3.20	(41)	3.08	(25)	2.68	(20)	2.68	(24)	2.41	(29)	2.38	(20)	5.89	(15)
Kyoto	3.51	(36)	3.68	(36)	3.86	(36)	3.48	(31)	2.92	(34)	2.28	(40)	2.42	(35)	2.52	(24)	2.41	(18)	5.69	(18)
Osaka	5.51	(7)	5.79	(6)	5.62	(7)	4.32	(9)	3.71	(8)	3.08	(8)	3.09	(8)	2.96	(8)	3.28	(4)	6.64	(6)
Hyogo	4.46	(16)	4.70	(18)	4.64	(20)	3.86	(18)	3.57	(10)	3.04	(10)	3.17	(6)	3.17	(3)	2.87	(6)	6.51	(7)
Nara	2.82	(46)	3.61	(42)	3.36	(45)	3.08	(44)	2.63	(44)	2.17	(45)	2.38	(40)	2.57	(21)	2.30	(23)	6.03	(12)
Wakayama	2.65	(47)	3.36	(46)	3.66	(43)	3.04	(46)	2.52	(47)	1.94	(47)	2.18	(45)	2.04	(46)	1.92	(38)	4.29	(47)
Tottori	4.55	(15)	4.63	(20)	4.64	(21)	3.64	(24)	3.21	(16)	2.54	(26)	2.70	(23)	2.64	(20)	2.39	(19)	5.52	(22)
Shimane	3.35	(40)	3.66	(37)	3.70	(41)	3.22	(40)	2.60	(46)	2.18	(44)	2.11	(46)	2.32	(33)	1.92	(39)	4.90	(38)
Okayama	3.95	(27)	4.41	(24)	4.21	(32)	3.61	(26)	2.96	(32)	2.55	(25)	2.53	(31)	2.31	(35)	2.54	(14)	5.35	(26)
Hiroshima	4.70	(13)	5.06	(12)	4.96	(16)	3.94	(13)	3.57	(11)	2.85	(13)	2.74	(20)	2.93	(10)	2.56	(13)	6.02	(14)
Yamaguchi	3.99	(25)	4.84	(17)	4.49	(24)	3.57	(27)	3.02	(30)	2.59	(24)	2.79	(18)	2.53	(23)	2.26	(25)	5.35	(27)
Tokushima	3.53	(35)	3.84	(35)	4.23	(31)	3.28	(38)	2.77	(40)	2.20	(43)	2.29	(43)	2.13	(45)	2.32	(22)	4.75	(43)
Kagawa	3.88	(32)	3.91	(34)	4.33	(28)	3.30	(36)	3.08	(24)	2.48	(30)	2.64	(25)	2.41	(27)	1.92	(37)	5.42	(24)
Ehime	4.33	(18)	4.62	(21)	4.78	(18)	3.87	(17)	3.20	(17)	2.40	(35)	2.57	(29)	2.28	(36)	2.09	(28)	4.67	(45)
Kochi	5.01	(11)	5.11	(11)	5.00	(14)	3.93	(14)	3.18	(18)	2.50	(29)	2.70	(22)	2.49	(25)	2.29	(24)	4.97	(37)
Fukuoka	6.21	(2)	6.00	(3)	6.09	(3)	4.59	(4)	4.02	(2)	3.36	(2)	3.53	(2)	3.33	(2)	3.27	(5)	7.11	(3)
Saga	3.45	(38)	4.00	(32)	4.10	(35)	3.33	(35)	2.94	(33)	2.72	(18)	2.79	(16)	2.71	(17)	2.20	(27)	5.63	(19)
Nagasaki	4.37	(17)	4.65	(19)	5.00	(15)	3.96	(12)	3.12	(23)	2.71	(19)	2.79	(17)	2.67	(19)	2.05	(31)	5.33	(29)
Kumamoto	4.15	(23)	4.91	(15)	5.11	(12)	3.92	(16)	3.40	(12)	2.85	(12)	2.73	(21)	2.75	(16)	2.50	(15)	5.84	(16)
Oita	4.57	(14)	5.17	(10)	5.01	(13)	3.93	(15)	3.39	(13)	2.75	(16)	3.08	(9)	2.70	(18)	2.41	(17)	5.72	(17)
Miyazaki	5.85	(3)	6.69	(2)	6.46	(2)	4.38	(7)	3.71	(7)	3.14	(4)	3.20	(5)	2.90	(11)	2.81	(8)	5.44	(23)
Kagoshima	4.30	(19)	4.87	(16)	5.35	(9)	4.06	(11)	3.25	(15)	2.83	(14)	2.79	(19)	2.98	(6)	2.46	(16)	5.53	(21)
Okinawa	11.54	(1)	9.46	(1)	8.78	(1)	6.79	(1)	5.75	(1)	4.84	(1)	4.51	(1)	4.29	(1)	3.66	(2)	7.06	(4)

Source: Author's calculation based on the Economic Census (2009-) and the Establishment and Enterprise Census (1972~2006).

Table 2. Correlation matrix between different times of business start-up rates in prefectures

	1972-75	75-78	78-81	81-86	86-91	91-96	96-2001	2001-06	2009-12	2012-14
1972-75	1.000									
75-78	0.962	1.000								
78-81	0.945	0.978	1.000							
81-86	0.967	0.960	0.967	1.000						
86-91	0.952	0.944	0.936	0.966	1.000					
91-96	0.929	0.915	0.912	0.928	0.951	1.000				
96-2001	0.899	0.902	0.900	0.898	0.924	0.968	1.000			
2001-06	0.848	0.856	0.860	0.870	0.895	0.933	0.942	1.000		
2009-12	0.690	0.719	0.698	0.703	0.741	0.787	0.821	0.839	1.000	
2012-14	0.573	0.563	0.569	0.605	0.650	0.720	0.758	0.794	0.875	1.000

Source: Author's calculation from Economic Census (2009~), Establishment and Enterprise Census (1972~2006).

3. Literature review

Research on the regional factors that promote/suppress new establishments has been conducted in recent years from various perspectives. For example, a study that empirically analyzed the company establishment ratio using data for each metropolitan area in Texas (Sutaria and Hicks [2004]), the impact of the labor force status of US counties on self-employment choices (Goetz and Rupasingha [2014]), a study that analyzed sectoral differences in factors contributing to the establishment of new businesses (Binet and Facchini [2015], Daskalopoulou and Liargovas [2008]), a study that showed that only industrial clusters have promoting effects on business startups (Rocha and Sternberg [2005]), a study that analyzed the effect of local human capital accumulation on business startup behavior (Audretsch et al. [2010], Stuetzer et al. [2013]), and an analysis of the impact of familiar role models on entrepreneurial behavior (Dorse and Walter [2012]).

As described above, research on the determinants of entrepreneurial behavior has made progress from various point of views. Among these, studies revealing that the regional entrepreneurship level has a sustainable nature in time series has mainly been promoted in Europe.

Fritsch and Mueller [2007] showed that there has been a strong path-dependence in regional business start-up activities, using data on the number of establishments in the former West Germany region. Similarly, Fotopoulos and Storey [2017] analyzed the self-employment ratio of each region in England and Wales 90 years ago, 40 years ago and today, and showed that the self-employment ratios in the past have strong effects on the current self-employment ratio. On the other hand, the study pointed out some fluctuations in the long term, for example, the self-employment ratio increased in the London area and a decreased in coastal areas.

Table 3. Previous research on the impact of historical factors on local business start-up activities

Author(Year)	Abstract
Fritsch and Mueller (2007)	<ul style="list-style-type: none"> • Data on the number of establishments in the former West Germany region from 1983 to 2002. • The correlation coefficient between the start-up rates in consecutive years is very high, 0.96 to 0.98. Although this relationship decreases as the with time, the correlation coefficient remains 0.8 or higher even with a time difference of 19 years. In other words, the difference in the local start-up rate could be largely explained by previous start-up activities, and there was a high degree of path dependency. • Encouraging innovation and creating an entrepreneurial atmosphere may be appropriate as a starting point for policies, but these measures only had a significant impact over the long term.
Andersson and Koster (2011)	<ul style="list-style-type: none"> • Two mechanisms that affect different regional start-up rates were identified in Sweden: (1) effects of factors that change only slowly (<i>e.g.</i>, local income/education levels and population density) on startup activities; and (2) path dependency that past startup activities affect current activities. • It was shown that the regional business start-up rate had strong sustainability. Both of the factors had a significant effect at the same time. In particular, regions with high start-up rates were more sustainable than regions with low rates. • The process of change is inherently slow and policy efforts must be seen over a long time span. Persistent efforts that affect the structural elements of the local economy are required.
Fotopoulos and Storey(2017)	<ul style="list-style-type: none"> • Analysis on the sustainability of regional differences in the self-employment ratio between 1921 and 2011 in England and Wales suggests that the past self-employment ratio has a strong path dependency on the future. • On the other hand, some changes in the rankings are observed, such as the London area rising, while the coastal area falling. Fluctuations are related to changes in industrial structure, changes in human capital, age structure, immigrants, etc.
Fritsch and Wyrwich (2017)	<ul style="list-style-type: none"> • 70 planning regions in the West Germany region were investigated. The period investigated was from 1976 to 2010, and the 1976 start-up rate was used as a proxy for entrepreneurship. The regional start-up rate was determined as the number of non-agricultural private establishments divided by the number of local workers. • Regions that had a high self-employed ratio in the mid- 1920s recorded a high start-up rate even after 50 years. In other words, regional culture was an important source for sustaining entrepreneurship. Start-up activities also had an important effect on the increase in local employment.
Fritsch et al. (2018)	<ul style="list-style-type: none"> • Regions with large-scale heavy industry showed low values for entrepreneurship indicators. • A positive relationship was identified between the historical individual business ratio and the establishment of new companies in recent years. The same applies to the proportion of historical science and technology-based businesses. On the other hand, the relationship between the ratio of domestic or agricultural workers and the establishment of companies today was negative. These work styles do not indicate an individual entrepreneurial attitude. • Comparing the self-employed ratio of 1925 with today's entrepreneurial personality revealed a positive and significant relationship. In other words, historical self-employment was the source of today's entrepreneurial culture. • A negative relationship was identified between the geographical distance to traditional engineering universities and the current innovation activities. The continuity of relatively high regional innovation activities was shown. • The mechanism of transition of entrepreneurial culture has not been elucidated and will be left to future research. For example, it is not clear how much impact a destructive external shock has.
Percoco(2015)	<ul style="list-style-type: none"> • The relationship between the characteristics of agricultural production in each region of Italy, the family structure, and the level of entrepreneurship in the region was analyzed. Specifically, the inequality of land ownership as of 1931, the proportion of peasants as of 1911, and the family structure classification as of 1950 were used as explanatory indicators of today's regional entrepreneurship. • High concentration of land and strong family ties were factors inhibiting entrepreneurship. On the other hand, the spread of peasant contracts was linked to high entrepreneurship.
Stuetzer et al. (2016)	<ul style="list-style-type: none"> • This empirical study showed that the level of modern entrepreneurial activity in the UK was negatively influenced by the historical presence of large-scale industries. The employment ratio of large-scale industries in the 19th century, the distance to the coal mine, etc. were used as explanatory variables to analyze the level of entrepreneurial activity by region in the UK as of 2011. • If the employment ratio of large-scale industries as of 1891 was 10% higher, the ratio of self-employment as of 2011 would decrease by 1.5% and the start-up ratio would decrease by 1.7%.
Talhelm et al. (2014)	<ul style="list-style-type: none"> • Students from various regions of China were analyzed from three scales, namely, cultural thinking, tacit individualism, and sympathy. The explained variables are common cultural norms. • Major rice farming areas had the following features in comparison to wheat farming areas: (1) they are interdependent, (2) they tended to evaluate themselves as conservative, (3) the divorce rate was low, and (4) the percentage of successful patents was low. The people in the rice farming area built irrigation systems, which required cooperation between individuals, built a close mutually beneficial relationship, and avoided conflictive actions. • Wheat was easier to grow than rice. No irrigation was required, and there was no need for cooperation with neighbors over water. Also, the workload was light, which meant that farmers could look after their own crops without relying on their neighbors. These differences created differences in local cultural thinking.

Source: Author's edit from previous studies.

In recent years, an increasing number of studies have begun to analyze regional factors that relate to such path-dependence. Andersson and Koster [2011] identified two different mechanisms influencing the sustainability of the local start-up rate: (1) sustainable regional factors that change very slowly (income/education level, population density, etc.), (2) demonstration effects, wherein past entrepreneurial activities affected current activities. Based on the analysis, they argued that it was difficult to improve areas with chronically low start-up rates, and suggested that political efforts have to be made over a longer time span. Fritsch and Wyrwich [2017] shows that that innovation, the entrepreneurial climate and unemployment affect the local start-up levels, and suggested that policy attempts to create an entrepreneurial atmosphere are appropriate, although these only have long-term effects.

In Japan, some studies in recent years have attempted to clarify regional specific effects. Using the panel data on business start-up rates at three points in each prefecture, Omoto [2007], calculated the fixed effect for each region, and showed that factors which positively affect the start-up rate were working strongly in Chugoku, Shikoku and Kyushu regions. Kiminami et al. [2019] analyzed the impact of local social capital on business start-ups by utilizing a structural equation model for each prefecture. In their study, they showed that “bridging type social capital,” which represents relatively loose relationships between dissimilar actors, has a positive effect on the establishment of new businesses, while “bonding type social capital,” which represents connection of people within an organization in a homogeneous manner, has a negative effect.

Some studies have revealed a relationship between the regional industrial structure, which is built historically, and the level of entrepreneurship. For example, Stuetzer et al. [2016] shows that current levels of entrepreneurship are negatively influenced by historical industrial structures, especially the presence of large industries. In addition, Fritsch et al. [2018] showed that (1) regions with large-scale heavy industries have less human resources with entrepreneurial minds, (2) there is a positive relationship between the historical basis of science and technology and establishment of new companies, (3) there is a negative relationship between the proportion of domestic or agricultural workers and the business start-up today, and (4) there is a negative relationship between the geographical distance from traditional engineering universities and innovation activities (the existence of continuity in the level of regional innovation activities). In addition, Acs et al. [2018] analyzed the impact of the entrepreneurial institutional “ecosystem” (NSE) as an explanation of the Solow residual

on economic growth disparity, and empirically showed that it boosted the country's economic growth.

There are studies that show that agricultural characteristics that have historically taken root in a region influence the today's entrepreneurial spirit. Talhelm et al. [2014] analyzed the characteristics of students' thinking in China, linking them with the characteristics of agriculture in their hometowns. Students in rice culture areas displayed more interdependence than those in wheat culture areas. They had a cultural norm of understating themselves and had a low percentage of successful patents, and there are many factors that had a negative impact on entrepreneurial behavior. Percoco [2015] analyzed the characteristics of agricultural production in Italy, the family structure, and the trends in entrepreneurship levels in the region. They clarified that regional entrepreneurship activities are restrained where land ownership structures were historically unequal, and families were strongly connected. Also, they clarified that there is a relatively strong tendency to entrepreneurship in regions where the proportion of peasant contracts was high.

Regarding the impact of agricultural crop characteristics on the formation of local communities and spiritual characteristics, several previous studies in Japan have used qualitative approaches. For example, Fujii and Hosoda [1984] compared rural spaces for paddy fields, field crops, and coastal villages in Ibaraki Prefecture, and considered regional characteristics. In this study, they discovered that rice paddy villages have similar shape of houses. From there, they suggested that "collective labor and systematic cooperation and water management were necessary for rice farming, and these activities have created a consciousness of trying to keep pace within the village. This mentality appears as a hedge of uniform type and height. In contrast, in field crop areas, dependence on rivers are low, and yield is highly dependent on personal efforts such as plowing, fertilizing, and weeding. Production activities are personal and not as constant as rice cultivation ". In the latest research, Nagano [2018] used the Agricultural Census from 1970 to 2015 and showed that (1) the rate of decrease of farmers was higher in the settlement farm villages than in existing farm villages, (2) settlement farm villages and crop farming villages have no self-sufficiency farmers, contrary to existing villages centered on paddy cultivation which are tend to be self-sufficient. Citing the research of Otake [2018], she concluded that settlement farmland focused on production for the market and emphasizing efficiency, while existing villages tended to focus on self-sufficiency.

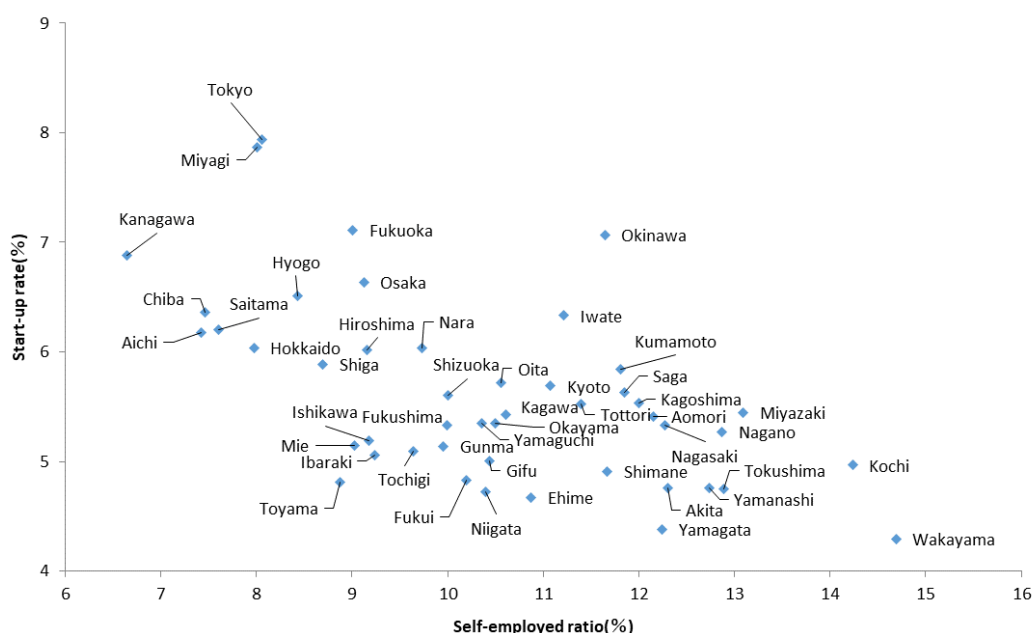
Thus, in recent years, research that focuses on the historical process of forming a local entrepreneurial climate has gradually accumulated in foreign countries. Looking back on the situation

in Japan, empirical studies on the determinants of regional start-up activities have been gradually accumulated and refined (Otsuka [2008], etc.). However, research that focuses on the historical background of regional industrial accumulation is relatively rare, with the exception of some qualitative studies focused on the impact on current new establishments. In this study, in addition to the current social and economic factors, we take into account the path-dependent factors that have taken root in each region over many years and which are believed to have an impact on the entrepreneurial spirit.

4. Data and analysis model

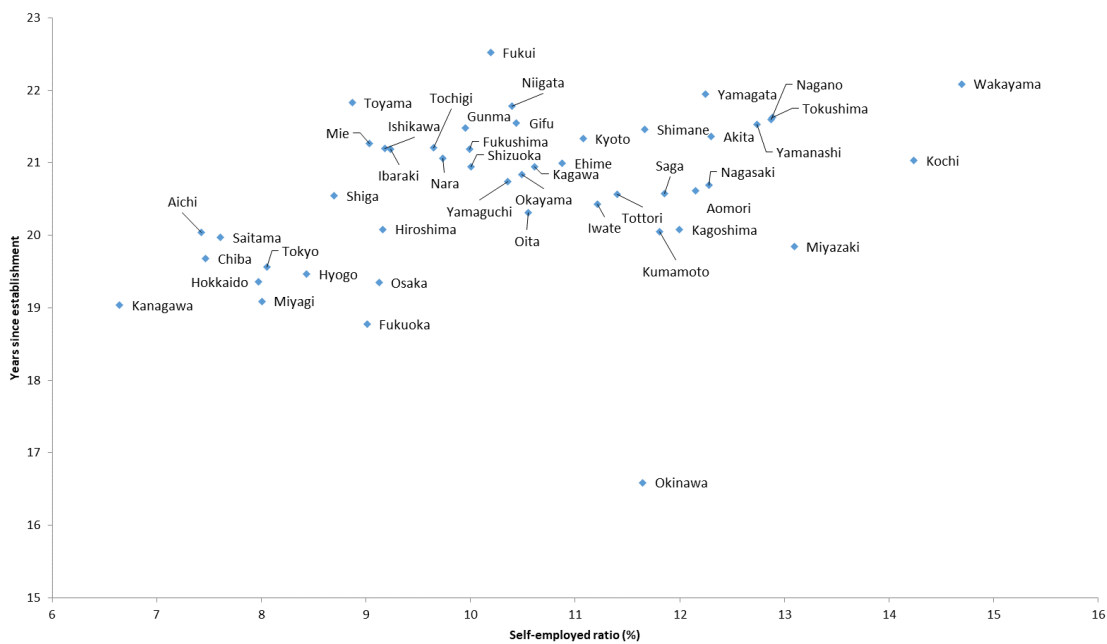
1) Entrepreneurial activity index

As an indicator of the level of local entrepreneurship, some previous studies used the local self-employment ratio (Fotopoulos and Storey (2017) etc.). However, when we look at the correlation between the self-employment ratio and the business start-up rate by prefecture in Japan, a negative correlation is recognized, as shown in Figure 1. Also, as shown in Figure 2, there is a positive correlation between the average number of years since establishment and the self-employment ratio. This is because areas where the ratio of self-employment is high, the proportion of SMEs with a long history is high, and the replacement of companies are relatively inactive.



Source: Author's calculation based on the Ministry of Internal Affairs and Communications, "Basic Survey on Employment Structure" (2012) and "Economic Census" (2012, 2014)

Figure 1. Distribution of self-employment rate and business start-up rate by prefecture



Source: Author's calculation based on the Ministry of Internal Affairs and Communications, "Basic Survey on Employment Structure" (2012) and "Economic Census" (2012, 2014)

Figure 2. Distribution of self-employment ratio and the number of years since establishment

In order to measure the entrepreneurial activity in the region more accurately, it is therefore more appropriate to use the ratio of establishments that are newly opened during a specific period (business start-up rate) in Japan. For this reason, the present study uses the average annual business start-up rate of each prefecture from 2012 to 2014 as an explained variable.¹

2) Explanatory variables

In this study, the factors affecting the level of entrepreneurship in each region are broadly divided into two categories. Namely, the conditions during the same period as the analysis (*e.g.*, economic environment, labor force, industrial structure, etc.) and historical factors that are thought to have influenced the entrepreneurial activities in each region for many years (industrial structure, population / household structure, etc.). The explanatory variables in each area were set as follows, taking into account previous research and the current situation.

¹ The Economic Census was used to calculate the business start-up rate of each prefecture. The specific calculation formula is as follows;
Annual business start-up rate = $(1 + (\text{number of new establishments for the period}) / (\text{number of establishments in 2012}))^{(12/29)} - 1$
Since the 2012 Economic Census was conducted on February 1, 2014, and the 2014 Economic Census was conducted on July 1, 2012, the number of months elapsed (29 months) was recalculated to the annual rate based on the calculation.

(1) Economic activity factors

As indicated by the fact that start-up rate is relatively high in large metropolitan areas where economic activities are concentrated, it follows that the economic vitality is a factor affecting entrepreneurial activities. Several previous studies have also demonstrated the relationship between regional economic vitality and the degree of new entrants (Carree et al. [2002], Yamawaki [1991], SME Agency [2002]). It is therefore considered appropriate to adopt an index indicating economic vitality as an explanatory variable.

In the present study, the GDP growth rate of each prefecture is set as an explanatory variable. However, the analysis period in this study was from 2012 to 2014, just after the Great East Japan Earthquake (March 2011). It should be considered that it was a period in which public works were mainly focused on disaster recovery in the affected areas. Another major explanatory variable for the business start-up is the population growth rate; however, the economic growth rate and population growth rate are strongly correlated, and there is a risk that multicollinearity will occur if they are put into the model at the same time. Thus, in order to take into account the impact of public works during the study period on the economic activities in each region, the rate of increase in public works expenses by prefecture was used as an instrumental variable for the economic growth rate in each region. The estimated economic growth rate was used as an explanatory variable for the business start-up rate.

(2) Population and labor factors

Along with economic activity factors, population and labor factors, indicated by changes in the population and employment status in each region, greatly affect entrepreneurial behavior. Previous studies have also shown that areas with a growing population tend to encourage business start-ups, along with increased economic vitality (Reynolds et al. [1995]). In addition, many previous studies have analyzed the impact of regional labor force diversity and education levels on start-up behavior, showing that business start-ups are generally promoted in regions where there are diversified or highly educated workforces.

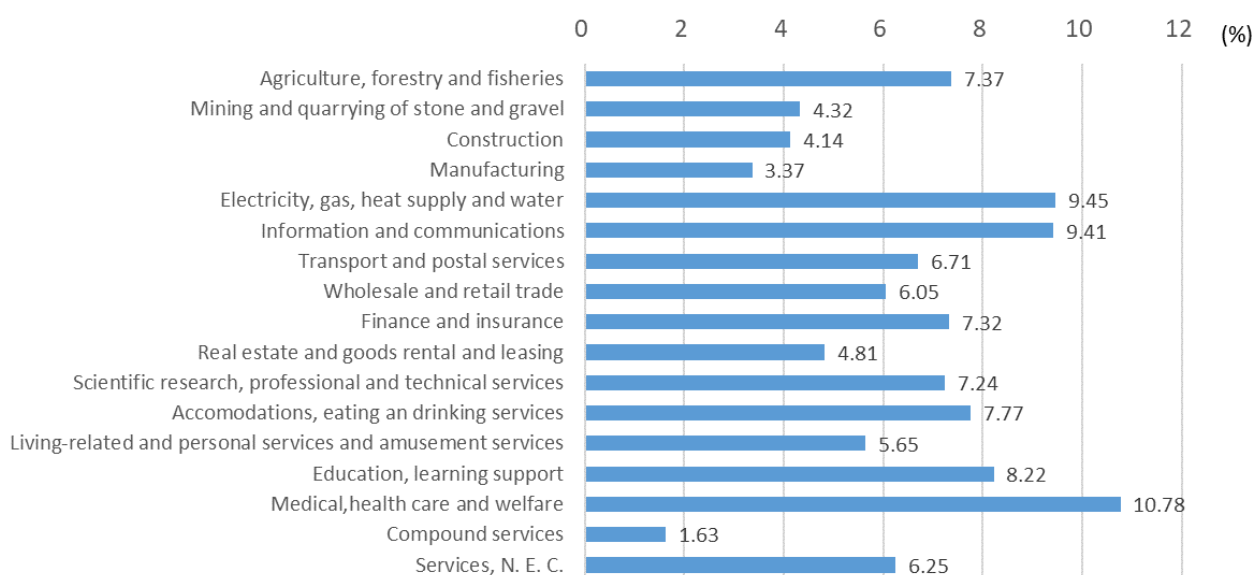
On the other hand, in previous studies, opinions have been divided about the impact of local employment conditions on entrepreneurial activities. Specifically, some previous studies (Storey [1991], Evans and Lighton [1990]) have shown that the deterioration of the local employment

environment, which is indicated by an increase in the unemployment rate, activates start-up behavior. Another study has shown that a high unemployment rate indicates a slowdown in economic activity, indicating that it is a factor restrains new business start-ups (Reynolds et al. [1995]).

It follows that the impact of the quantitative and qualitative accumulation of the local population and the employment situation have effects on the establishment of new businesses. We therefore applied some variables that expressed population and labor situations of each region in the present study. Specifically, we applied the population growth rate, day/night population ratio as a quantitative aspect of the population, the ratio of foreigners, the ratio of university graduates, and the ratio of junior college or technical college graduates as qualitative aspects of labor force. The unemployment rate and the ratio of non-regular employees were set as employment situation factors.

(3) Industrial structure factors

Figure 3 shows a comparison of the annual average business start-up rates according to industrial classification: there is a large difference according to type of industry. As a common trend, the business start-up rate in secondary industries (especially the manufacturing industry) is relatively low in comparison to tertiary industries, as the cost of opening such businesses is higher. For this reason, in regions with a high secondary industry ratio (in terms of industrial structure), the opening rate is supposed to be relatively suppressed.



Source: Author's calculation based on "Economic Census" (2012,2014)

Figure 3. Annual average business start-up rates by industry in Japan (2012-14)

In the present study, in order to consider the impact of the industrial structure (described above) on the business start-up rate, a shift share analysis² method was used. This analysis summarizes the factors that separate regional economic growth from national economic growth into the structural characteristics of the industry (industrial structure factors) and other regional factors (regional specific factors). This method measures how much each index affects the growth of the local economy (Satake [1984]). By applying this to the analysis, it becomes possible to distinguish the effect of the industrial structure and the effect of other regional factors on the business start-up rate in each prefecture. In this study, the difference between the expected business start-up rate calculated from the industry structure of each prefecture, which is obtained based on the shift share analysis, and the start-up rate in the whole country is used as an explanatory variable. This variable is defined as the “industrial structure bonus/onus,” and its explanatory power is verified. Specifically, the “industrial structure bonus/onus” is calculated by the following equation:

$$ISBO_r = \sum_j C_r^j SR^j - SR$$

Where, $ISBO_r$ is the industrial structure bonus/onus of region r , C_r^j is the share of the industry j in region r , SR^j is the nationwide start-up rate of industry j , and SR is represents the national business start-up rate of the entire industry.

Next, we examined the impact of leading companies located in each region on the establishment of new businesses. Large corporations and leading companies located in a region may become a factor that vitalizes the local economy and thus promotes business start-ups via the ripple effect in terms of transactions. On the other hand, their presence attracts local human resources and may reduce human resources that could be applied in new establishments. Similarly, the average size of business establishments in the region would also become a signal of the traction of the local economy or the high barriers to entry (it may connote difficulty to survive for businesses that are not of a certain scale). There are possibilities for both aspects. This study uses the number of listed companies in the region, the number of influential companies not listed, and the average number of employees per office as explanatory variables to analyze whether a positive or negative impacts appears.

² See Satake [1984], Kobayashi [2004], etc. for an explanation of the specific measurement methods used for shift share analysis.

(4) Funding factors

A major threshold at the time of a new establishment is the procurement of necessary funds. Unlike the United States, where there are plenty of funding opportunities from venture capital and business angels that underwrite stocks and bonds, the opportunities to receive loans from financial institutions is one of the most important factors in Japan.

We used the growth of loan balances from financial institutions in each prefecture as quantitative aspects, and the average interest rate of each prefecture as qualitative aspects to examine the effects of funding factors on business start-ups. With regard to the loan balance, an opposite causal relationship can be considered, namely, the loan balance increases as new establishments become active. Therefore, we adopted the growth rate of loan balances in the previous term as an explanatory variable, in order to verify the impact of funding on new establishments. In addition, since the information on the interest rate level in each prefecture was limited, we utilized data published by Teikoku Databank (average lending interest rates in each prefecture in fiscal 2008 and 2017).

In addition, the availability of collateral prescribes the ease of funding. For this reason, previous research in Western countries has shown that home ownership can be a driving factor for new businesses (Moyes and Westhead [1990], Illeris [1986]). However, in Japan, a study by Kobayashi [2004], which analyzed the period from the 1970s to the 1990s, showed that rate of home ownership has a negative impact on the business start-up rate due to an increase in the loan burden on households. As over 10 years have passed since the previous research in Japan, we add the ratio of home ownership as an explanatory variable in order to reinvestigate the collateral effect of house ownership in this study.

(5) Historical factors and agricultural production characteristics

Previous studies have pointed out that the characteristics of local agricultural production affect the regional characteristics, especially the spiritual characteristics of local residents which have historically developed. In many cases, regions engaged in rice farming have been predominantly shown interdependent and cooperative behavioral characteristics, which has tended to suppress entrepreneurial behavior (Talhelm et al. (2014), Fujii and Hosoda (1984)). In addition to the regional characteristics derived from crop varieties, a previous study reported that the degree of concentration of land ownership and production activities affects the current entrepreneurial behavior of a region

(Percoco (2015)). In this study, the following explanatory variables were set in order to verify whether the findings of previous research are still valid in Japan today.

Table 4. List of explanatory variables used in this study

Factor	Sub-item	Practical Index	Expected sign	Data source
Economic activity factors	GDP growth rate of each prefecture	Estimated value of economic growth rate (%) with the public construction contract growth rate (2012⇒2014) as the instrumental variable	+	MIC “Annual Report on Prefectural Accounts” MLIT “Current Survey for Construction”
	Population growth rate	Population growth rate (2012-2014)(%)	+	MIC “Basic resident register”
Population and labor factors	Day/night population ratio	Day/night population ratio (%)	+	MIC “National census” (2010)
	Ratio of foreigners	Percentage of foreigners in the total population (%)	+	
	Ratio of university graduates	Proportion of university graduates (or above) in the total population (%)	±	
	Ratio of junior college or technical college graduates	Proportion of technical college or junior college graduates (or above) in the total population (%)	±	MIC “Labor force survey” MIC “Employment status survey” (2012)
	Unemployment rate	Unemployment rate (2011) (%)	±	
	Ratio of non-regular employee	Non-regular employee (%)	±	
Industrial structure factors	Industrial structure bonus/onus	Calculate the expected value of the start-up rate based on the industry structure by using a shift share analysis and measure the industry structure bonus/onus from the nationwide start-up rate	+	MIC “Economic census” (2012)
	Number of listed companies	Number of listed companies (2014)	±	Toyo Keizai Shinpo “Regional Economic Directory”
	Number of influential companies not listed	Number of influential companies not listed (2014)	±	Toyo Keizai Shinpo “Company quarterly/unlisted company version”
	Average number of employees per office	Average number of employees per office (2012)	±	MIC “Economic Census” (2012)
Funding factors	Average interest rate of each prefecture	Average borrowing rate (average rate of 2008 and 2017)	–	Teikoku Data Bank
	Ratio of home ownership	Ratio of home ownership (%)	±	MIC “House/Land Statistics Survey” (2008, 13)
	Growth of loan balances	Increase/decrease rate of loan balance in each prefecture (2011⇒2013) (%)	+	The Financial Journal (Special Edition) (2012, 2014)
Historical factors and agricultural production characteristics	Rice cropping ratio	Percentage of rice in total agricultural production (%) (2012)	–	MAFF “Production Agriculture Income Statistics”
	Rice cropping area ratio	Ratio of rice cropping area to total cropping area (average of 1925 and 1940)	–	Agricultural and Forestry Statistics Study Group “Prefectural Agriculture Basic Statistics”
	Percentage of contract/half-contract farmers	Percentage of peasant/self-produced farmers among all farmers (average of 1925 and 1940)	±	
	Ratio of mining workers	Ratio of mining workers to all industries (1930)	–	“National Census” (1930)

The official names of the following abbreviations are as follows:

MIC: Ministry of Internal Affairs and Communications

MLIT: Ministry of Land, Infrastructure, Transport and Tourism

MAFF: Ministry of Agriculture, Forestry and Fisheries

A. Rice cropping area ratio (1925 and 1940 average), Rice cropping ratio (2012)

In order to verify the impact of the characteristics of agricultural production on the abovementioned entrepreneurial activities, the proportion of rice crops in each prefecture in the prewar period and today is adopted as an explanatory variable. Unfortunately, for the pre-war period, only the acreage area by crop is available as statistical data; thus, the area of rice acreage among all crops is used as the explanatory variable. As for the prewar period, there is a possibility that structural changes in agricultural production occurred before and after the Showa Agricultural Depression, which occurred between 1930 and 1931. We therefore adopted the average of 1925 and 1940 to reflect the situation before and after the depression.

B. Percentage of contract/half-contract farmers (average of 1925 and 1940)

Percoco [2015], who analyzed Italy's situations, showed that current entrepreneurial activities are relatively active in areas in which the ratio of contract farmers was high approximately 100 years previously. In Japan, contract farming (or semi-contract farming) almost disappeared due to post-war farmland reform, but it was an important part of the agricultural management system in the prewar period. Thus, the impact of the relative weight of such pre-war contract farming on today's entrepreneurial activity is worth examining.

In the present study, the average proportion of contract farmers and half-contract farmers in 1925 and 1940 is used as an explanatory variable. As with the agricultural data by crop, there has been a slight change in the contracting status since the 1930 Showa Agricultural Depression period.³ We therefore decided to capture the average picture of the situation before and after the depression.

C. Ratio of mining workers (1930)

Previous studies have shown that entrepreneurial activity is relatively constrained in regions where large-scale businesses have historically accounted for a large proportion of local industries (Stuetzer et al. [2016], Fritsch et al. al. [2018]). In particular, the mining industry is a factor in the accumulation of other large-scale industrial groups with high demand for energy due to the high cost of transporting coal. In order to analyze whether the history of this historical industrial clustering has

³ After the Showa Agricultural Depression, there are cases where the proportion of self-produced farmers changing to contract or half-contract farmers has increased.

an impact on current entrepreneurial activities, this study uses the percentage of mining employees in 1930 as an explanatory variable.

Table 5. Descriptive statistics for each variable

Factor	Practical Index	Mean	Std. deviation	Minimum	Maximum
	Business start-up rate (2012-2014, %)	5.616	0.836	4.291	7.936
Economic activity factors	GDP growth rate of each prefecture (IV)	1.646	0.534	0.993	3.673
Population and labor factors	Population growth rate (2012-2014)(%)	-0.514	0.620	-1.824	1.179
	Day/night population ratio (%)	99.209	4.216	88.590	118.370
	Percentage of foreigners in the total population (%)	0.964	0.563	0.269	2.423
	Proportion of university graduates (or above) in the total population (%)	11.805	3.041	7.400	20.203
	Proportion of technical college or junior college graduates (or above) in the total population (%)	21.659	3.934	15.331	31.734
	Unemployment rate (2011) (%)	4.332	0.788	2.900	6.900
	Non-regular employee (%)	37.517	2.459	32.700	44.500
Industrial structure and agglomeration factors	Industrial structure bonus/onus	-0.026	0.119	-0.239	0.229
	Number of listed companies (2014)	75.638	262.425	1	1768
	Number of influential companies not listed (2014)	86.809	249.939	4	1658
	Average number of employees per office (2012)	9.344	1.138	7.658	13.796
Funding factors	Average borrowing rate (average rate of 2008 and 2017)	1.809	0.168	1.425	2.115
	Ratio of home ownership (%)	2.382	3.429	-3.715	12.321
	Increase / decrease rate of loan balance in each prefecture (2011⇒2013) (%)	66.333	7.299	44.450	77.850
Historical factors and agricultural production characteristics	Rice cropping ratio (2012)	27.026	18.532	0.400	71.100
	Rice cropping area ratio (average of 1925 and 1940)	53.607	16.074	15.561	86.624
	Percentage of contract/half-contract farmers (average of 1925 and 1940)	68.781	7.888	33.971	83.054
	Ratio of mining workers (1930)	0.933	1.755	0.059	10.546

3) Analysis model

The analysis model in this study tries to clarify how each factor described in the previous section affects the business start-up rate of each prefecture from 2012 to 2014. We introduce the "business start-up function," which sets explanatory variables (*e.g.*, economic activity, population/labor supply, industrial structure and funding/procurement) as factors affecting the rate of new start-ups in the region.

$$STR = \beta_0 + \sum_{n=1}^i \beta_n Modern + \sum_{n=1}^i \gamma_n History$$

Where *Modern* indicates modern factors and *History* indicates historical factors. As well as:

$$\beta_n Modern = f(Econ, PopLab, Indus, Finance, Agri)$$

Where *Econ* is the economic activity factor, *Poplab* is the population/labor supply factor, *Indus* is the industrial structure factor, *Finance* is the funding/procurement factor, and *Agri* is the agricultural production characteristic factor.

However, there is often a close relationship between the degree of economic activity and the increase (or decrease) of the population, and a risk of multicollinearity exists when these are included in the same analysis model. On the other hand, we must consider the influence of the Great East Japan Earthquake that occurred in March 2011. During the analysis period (immediately after the great earthquake), public works for reconstruction were greatly expanded, mainly in the affected regions. Since a significant portion of the economic growth rate in each region can be explained by the rate of increase or decrease in public works, it is necessary to measure the factors after removing their effects. Thus, the economic activity factor represented by the economic growth rate of each region was estimated using the rate of increase or decrease in public works expenses as an instrumental variable, and the estimated value was incorporated into the analysis model by adopting method of instrumental variables (IV).

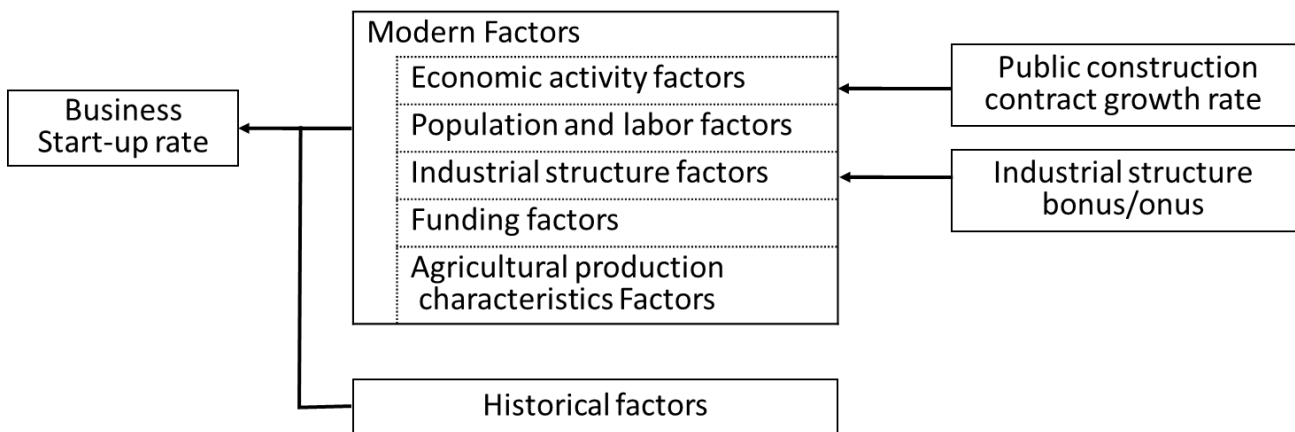


Figure 4. A Conceptual diagram of the analysis model

In addition, as described in the explanation of the explanatory variables, the business start-up rate varies considerably depending on the type of industry. Thus, as the industrial structure in each

region is considered to influence the business start-up rate, it is necessary to control in advance the influence of industrial structural factors and observe the effects of other factors.

In this study, the expected business start-up rate of each region, as seen from the industrial structure, is obtained from the shift share analysis, and is set as an explanatory variable in advance as an “industrial structure bonus/onus.” By adding this, we can observe the remaining regional factors (other than industrial structure) on business start-ups.

5. Results

Table 6 shows the results of a regression analysis of factors that determine the business start-up rate of each prefecture. First, we conducted a multiple regression analysis using all explanatory variables. Naturally, there are multiple collinearities between explanatory variables, such as the proportion of university graduates in the population as well as the proportion of junior college or technical college graduates; thus, a regression analysis using all variables is likely to contain unnecessary variables. We therefore created a regression model with maximal explanatory power utilizing a stepwise method (increase/decrease method, a p-value of 0.2 was used as a cutoff value for the acceptance/rejection of variables). The results of the regression analysis suggest the following findings.

1) Population and economic growth promote establishment

In the investigation of the relationship between the economic or population situation and the business start-up ratio, both were found to have positive effects, as hypothesized. In general, the economic growth rate and population increase move in the same way. However, during the study period, public works in regions affected by the earthquake were increased during the recovery period, which stimulated the economic growth rate. Thus, two variables independently had a positive impact on business start-ups.

2) Diversity of human resources boosts new business opening

As for the index that expresses the qualitative aspect of human resources, the ratio of foreigners was positive, with a significance level of 1%. As in the previous studies from Europe and the United States, the diversity of human resources could be seen as a driver of new business in the region.

On the other hand, although there was a positive correlation with the ratio of university/graduate school graduates, this did not show clear significance. Depending on the type of industry, a high level of education may be a factor that promotes the opening of businesses, but this was not clear in this analysis and is a topic that should be investigated in future research.

Table 6. The regression analysis of factors associated with prefectural business start-up rates

Dependent variable: Business start-up rate 2012-2014		All variables		Stepwise selection method (p-value = 0.2)	
		coefficient	t-value	coefficient	t-value
Economic activity factors	GDP growth rate (IV)	0.329	2.83***	0.283	3.02***
	Population growth rate	0.597	2.80***	0.501	3.70***
	Day/night population ratio	0.004	0.14		
Population and labor factors	Ratio of foreigners	0.349	1.52	0.403	2.31**
	Ratio of university graduates	0.046	0.37	0.033	1.35
	Ratio of junior college or technical college graduates	-0.001	-0.02		
	Unemployment rate	0.125	1.09	0.182	2.29**
	Ratio of non-regular employees	0.023	0.62		
Industrial structure and agglomeration factors	Industrial structure bonus/onus	3.387	3.60***	3.491	5.09***
	Number of listed companies (2014)	-0.005	-1.55	-0.003	-1.56
	Number of influential companies not listed (2014)	0.005	1.57	0.004	1.55
	Average number of employees per office (2012)	-0.011	-0.09		
Funding factors	Average borrowing rate (average rate of 2008 and 2017)	0.424	0.98		
	Ratio of home ownership (%)	0.019	0.91	0.026	1.48
	Increase/decrease rate of loan balance in each prefecture (2011⇒2013) (%)	0.011	0.47		
Historical factors and agricultural production characteristics	Rice cropping ratio (2012) (%)	0.015	2.30**	0.015	3.15***
	Rice cropping area ratio (Average of 1925 and 1940)	-0.013	-1.75*	-0.012	-2.13**
	Percentage of contract/half-contract farmers (Average of 1925 and 1940)	0.011	1.27	0.010	1.33
	Ratio of mining workers (1930)	0.029	0.85		
constant		0.7933	0.17	3.381	5.36***
n = 47		Adj. R ² = 0.868 F-value(19,27) = 16.9***		Adj. R ² = 0.888 F-value(12,34) = 31.4***	

Notes: * : statistically significant at the 10% level, ** : statistically significant at the 5% level, *** : statistically significant at the 1% level.

IV estimation result: $GDP \widehat{growth \ rate} = 0.024 \ public \ construction \ contract \ growth \ rate + 1.25$
(2.77***) (5.26***)

Adj. R² = 0.127, f -value = 7.69***

3) Supporting the “push hypothesis” that unemployment encourages the opening of new businesses

The results showed that the effect of the local unemployment rate on the business start-up rate was positive and significant. Regarding the relationship between unemployment and new business start-ups, previous studies have shown that both unemployment is a factor that can either promotes or restrains business start-ups. Judging from the results, at least in Japan during the study period, the "push hypothesis" (that unemployment promotes the opening of new businesses) is supported.

4) The industrial structure strongly regulates the start-up rate.

The effect of push-up (bonus) and pull (onus) on the start-up rate by the local industrial structure is positive and strongly significant (significance level: 1%). As the previous section demonstrated, tertiary industries have a relatively high start-up rate, while secondary industries (centering on the manufacturing industry) has a low start-up rate at the national level. The same can be seen at the regional level. That is, regions where tertiary industries are dominant tend to show high business start-up rates, while regions where the ratio of secondary sector industries are relatively high show low business start-up rates.

5) The concentration ratio of rice crops was a factor of restraining the opening of businesses in the historical context, but in recent years has also become a promoting factor.

The ratio of rice production to the whole agricultural production in each region shows different effects at historical and contemporary time points. The rice crop acreage ratio in the pre-war period showed negative and significant effect on the start-up ratio, while the modern rice production ratio showed positive and significant effect. As will be described later, when looking at the simple correlation between the business start-up rate and each explanatory variable, both variables showed a negative correlation. However, the contemporary impact became positive when other factors were added into the regression model.

6. Discussion

The analysis yielded results that both supported and contradicted hypotheses based on previous studies. Below, we will discuss each of the hypothesis.

First, we will summarize the results that support the initial hypothesis. It was found that the vitality of the regional economy, as indicated by economic growth and population growth, had a positive impact on new businesses, as expected. On the other hand, there was no positive or negative effect on the ratio of the daytime/nighttime population, taking into account the impact of the labor force movement between prefectures on the business start-up trend. The areas in which the population changed greatly during the day and night were mainly metropolitan areas, such as Tokyo and Osaka, and their surrounding areas. In the prefectures surrounding Tokyo (Chiba, Saitama, Kanagawa, etc.), the daytime/nighttime population ratio is particularly low, but the population growth rate is relatively high.⁴ There is a possibility that the effect of the trend of opening a business and commuting to the central Tokyo was offset by the effect opening a business corresponding to the population increase in the surrounding areas, and vice versa.

Second, regarding the effect of the qualitative aspect of the workforce on the start-up ratio, it has become clear that the effect of a high percentage of foreigners in a region boosts the start-up ratio. Previous studies in locations such as Florida [2005] have shown that in regions where human resource diversity is tolerated, creative corporate activities would become active, and the results of our analysis revealed a trend that was in line with this finding.

In previous studies in Japan, the results showed that the ratio of foreigners did not affect the rate of business start-ups. Traditionally, the proportion of foreigners living in Japan has generally been low, regardless of the region, so the impact of this proportion of the population on start-up behavior was considered to be limited. However, the ratio of foreigners has become higher in metropolitan areas such as Tokyo, and in areas with a large concentration of manufacturing industries such as the Chukyo area and northern Kanto in recent years. It is worth noting that the diversity of human resources in Japan has contributed---to a certain extent---to start-up activities in recent years. Detailed research, such as the specification of industries in which start-up activities are active in areas where the ratio of foreigners is high, will be the subject of future research.

Regarding the relationship between the educational background of human resources and start-up activities, previous studies showed negative results in France (Binet and Facchini [2015]), and positive effects in non-metropolitan areas in the US (Goetz and Rupasingha [2014]). Although

⁴ Strictly speaking, the population has hardly increased, but the rate of decrease is small in comparison to other regions.

these results were shown in these previous studies, there is still no clear effect in Japan. This is thought to be due to the fact that the start-up rate of all industries as an explanatory variable. This would include various factors, including technology, know-how and knowledge-intensiveness. It is necessary to conduct a more targeted analysis about the relationship between the educational level of human resources and the start-up fields.

Thirdly, regarding the relationship between the labor supply and demand environment and business start-up behavior, it was recognized that the higher the unemployment rate, the higher the business start-up ratio. Previous studies have shown several different results. A group of studies showed that poor labor supply-demand conditions (deterioration) promoted business start-ups (Binet and Facchini [2015], Omoto [2007], Sutaria and Hicks [2004], Evans and Lighton [1990]). Another study showed that low unemployment rate is a driving force for the opening of businesses (Reynolds et al. [1995]). Another study showed that the effect of employment on business start-ups is dependent on the types of area, namely, low unemployment has positive effects on start-ups in rural areas but negative effects in metropolitan areas (Batstone and Mansfield [1992]). As described above, the results of analysis have varied by country or region; however, the results of the present study support that unemployment promotes new business start-ups.

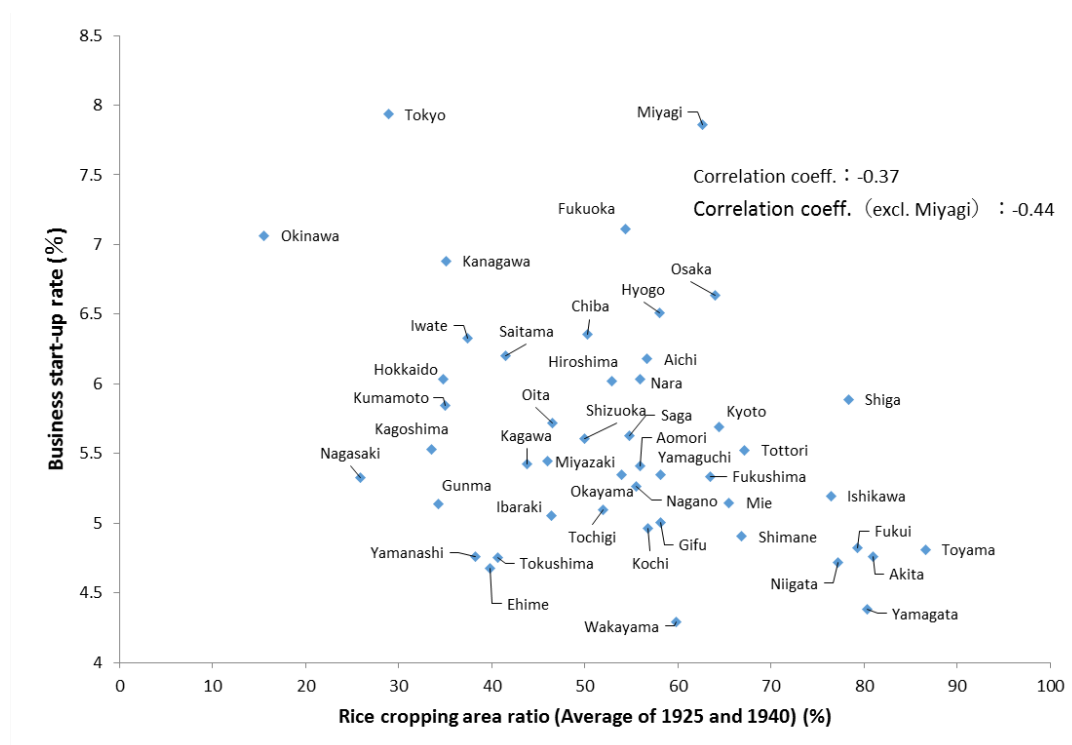
The most notable point in the results of this analysis is the impact of regional agricultural agglomeration characteristics on start-up rates. As the results show, the proportion of pre-war rice crops among total agricultural production has a negative impact on the modern start-up rate, which is consistent with the trends shown by previous studies. However, the proportion of rice production in among total agricultural production in each region today has a negative effect on the start-up rate.

Figure 5 and 6 show the correlation between the business start-up rate of each region and the ratio of rice cultivation before the war (Fig. 5), and the current ratio of rice production (Fig. 6). In the single correlation, it can be seen that all the explanatory variables have a negative relationship with the start-up rate. In other words, the impact of the agricultural characteristics of the region---represented by the current rice production ratio---on the business start-ups seems to be restrained at first glance. However, if other factors are taken into account, the characteristics will act in the direction of promoting business start-ups. How should this be interpreted?

Basically, rice cultivation increases the collective work of the whole region. As Talhelm *et al.* [2014] pointed out, rice farming requires a large amount of water, so farmers need to build irrigation

systems that require mutual cooperation, and rice farmers need to cooperate in water use. In addition, the paddy fields requires a great deal of labor. It is said that rice production takes at least twice as many working hours per unit area as compared to wheat production.⁵ In order to respond to the need for a large work force, cooperation of the labor force has advanced in the rice cropping region. Rice farmers worked closely together to build reciprocal close relationships and avoided conflictive behavior. It has been said that the characteristics of such production activities has acted to restrain local entrepreneurial activities as a result of the region's long-standing spiritual background, with cooperation seen as a virtue throughout the whole region.

A recent change in national agricultural policy may have changed the situation. As a result of the 2009 amendment to the Agricultural Land Law, even general corporations can now lease farmland almost freely⁶. As Figure 7 shows, the number of corporations engaged in agricultural production has increased significantly in recent years, many of these have been established by corporations.

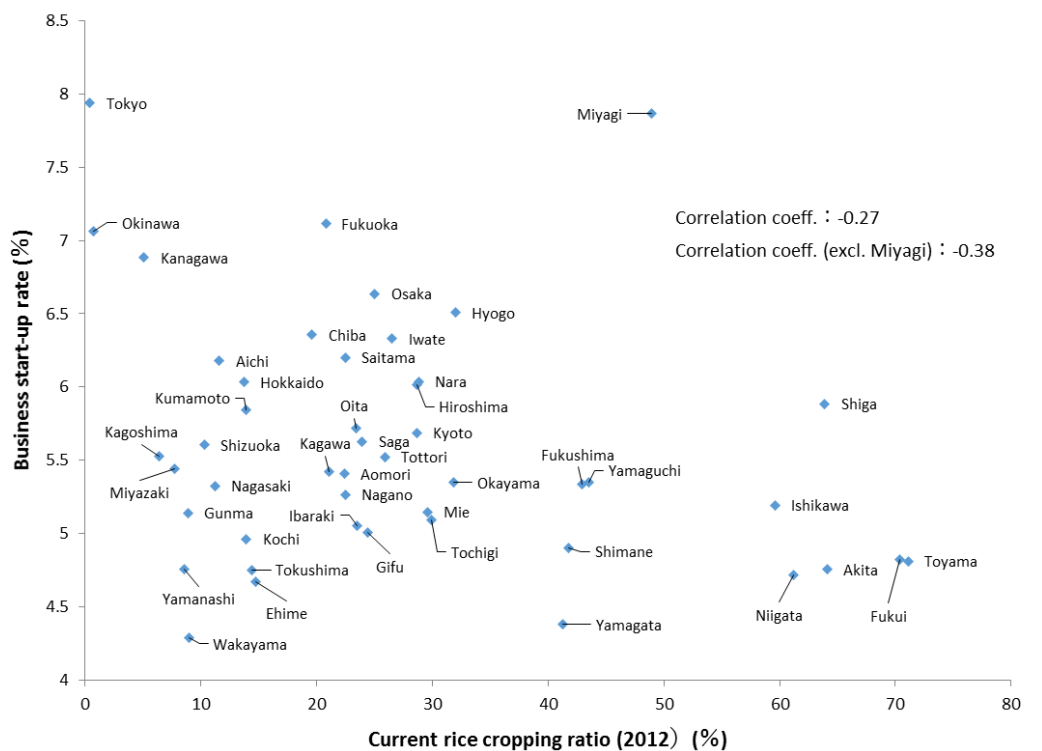


Source: Author's calculation based on "Economic Census" and "Prefectural Agriculture Basic Statistics"

Figure 5. Correlation between the ratio of rice cropping area in the prewar period and the current business start-up rate

⁵ According to the Ministry of Agriculture, Forestry and Fisheries "Agricultural Management Statistics Survey" (2016), the number of working hours per 10 acres is 23.76 hours for rice and 3.57 hours for wheat.

⁶ When a farmer's association, corporation or limited liability company intends to own (trade) farmland, it must be in an organizational form that conforms to the requirements of Article 2, Paragraph 3 of the Farmland Law.



Source: Author's calculation based on "Economic Census" and "Production Agriculture Income Statistics"

Figure 6. Correlation between the current rice production ratio and the business start-up rate

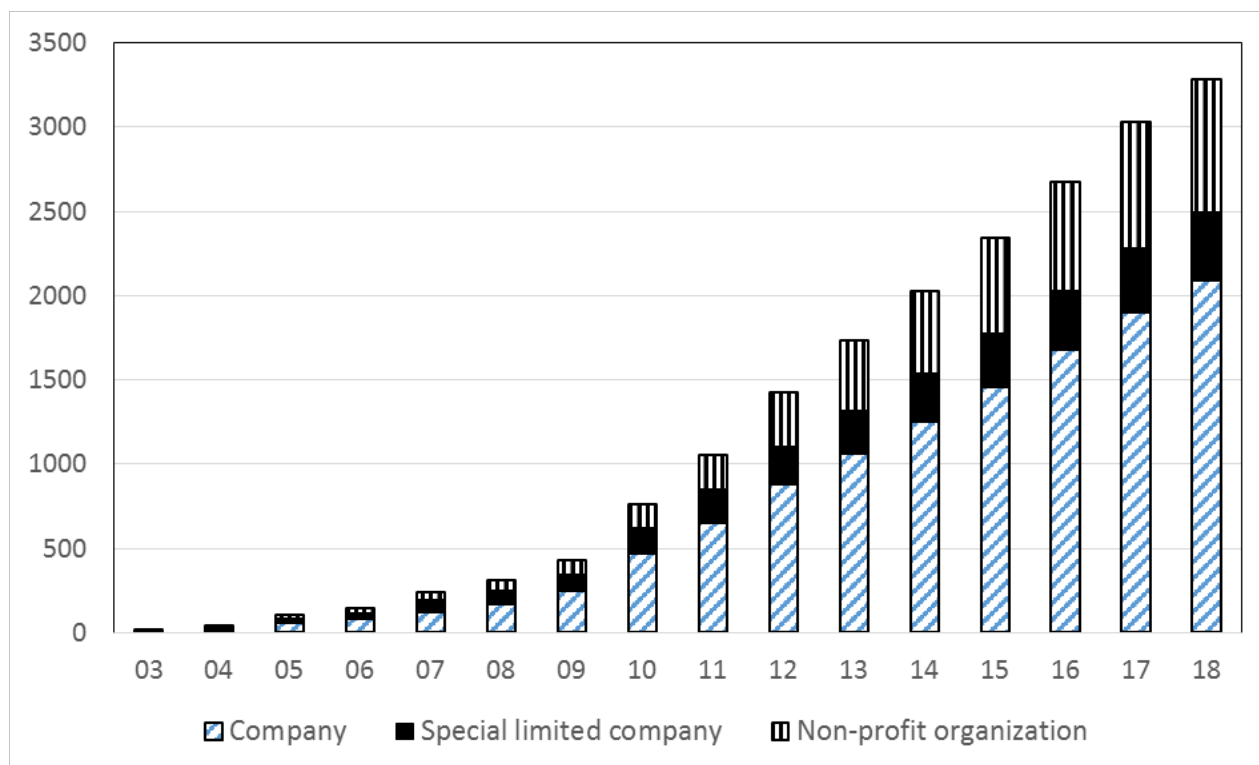
In addition, existing farmers are also shifting from family farms to corporate management. In order to respond to the decrease in the number of farmers, as well as the aging of farmers, the government has established policy incentives to promote incorporation, with the aim of promoting business succession, the acceptance of new farming and the improvement of business management capabilities. For example, the loan limit based on the agricultural management base strengthening fund is significantly increased for corporations (individuals, 300 million yen; corporations 1 billion yen). Corresponding to these incentives, the rate of rice farming corporations has increased in areas in which the machine ownership rate has been low (Tohoku, northern Kanto and northern Kyushu). It is thought that such a movement has partially contributed to the recent increase of corporations established in these regions.

Finally, regarding the proportion of mining workers in the pre-war period and the proportion of peasant farmers, which were included in the explanatory variables as they are considered to reflect the influence of historical regional characteristics, we did not observe the tendency that can be seen in

Table 7. Outline of the revised Agricultural Land Law

Main items	Summary
Review of the purpose of the law	Clarified that farmland is a valuable resource in the region, and promotes the acquisition of rights by farmers who use farmland efficiently and consider harmony with the region.
Securing good farmland in agricultural area	Farmland used by those who operate farming efficiently and stably is not allowed to be excluded from the farmland area.
Stricter regulations on diversion of farmland	Diversion from farmland to public facilities such as hospitals and schools has become stricter. Strengthening penalties for illegal diversion
Revision of farmland lease regulations	It became possible for corporations whose business domain is not agricultural production to borrow farmland. (One or more of the executive officers have to engage in agriculture)
Revision of agricultural production corporation requirements	Regarding investment in agricultural production corporations, investment limit per member was deregulated, from one-tenth to one-fourth. In addition, for food processors who meet certain requirements, the investment limit has been relaxed from less than a quarter to less than half.

Source: Summarized from the Ministry of Agriculture, Forestry and Fisheries (2012) “Amended Agricultural Land Law (Relevant to Companies Agricultural Entry)”



Source: Ministry of Agriculture, Forestry and Fisheries (2019), “Firm's entry to agricultural businesses”

Figure 7. Trends in agricultural entry by general corporations

prior European studies. The regions where the percentage of mining workers was high in the prewar period were Fukuoka (10.6% of all industrial workers), Saga (4.5%), Nagasaki (4.1%), Hokkaido

(3.2%), and Yamaguchi (2.8%). For example, Fukuoka Prefecture is one of the municipalities in the country with a high business start-up rate. This is partly due to the fact that the prefecture includes a big city (Fukuoka city) centered on tertiary industries, along with the former coal-producing area. In addition, a drastic change in core energy occurred in Japan during the high growth era (from the latter half of the 1950s to the beginning of the 1970s), namely, from coal to petroleum, liquified natural gas and atomic energy. The period under investigation in the present study is after the complete transformation of the local industrial structure. These facts are considered to be the reasons for this obscurity of the colliery location effect.

In addition, the proportion of self-sustaining and peasant farmers in the pre-war period did not have a significantly positive or negative effect. In Japan, under the post-war agricultural land reform, all peasant farmers converted into self-produced farms. In other words, instead of increasing productivity based on one's own ingenuity to become a self-produced farmers, the former peasant farmers acquired the status thanks to a change in the system by an outside policy. Such circumstances may have obscured the relationship between entrepreneurship and the status of farmers in pre-war period.

Table 8. Merit of agricultural corporation management

Point	Summary
Improve business management skills	Promote awareness of management responsibility Business management would become thorough by clearly separating household and management (breaking away from ballpark figure).
Improve external creditworthiness	Mandatory financial statement preparation increases credit from financial institutions and business partners.
Expansion of management development possibilities	By employing a wide range of human resources, the possibility of business development such as management diversification, expands and development can be expected.
Improving the welfare of farmers	Enhancing employee welfare by applying social insurance and labor insurance Clarification of working conditions by establishing working rules, such as working hours and implementing a salary system
Facilitating management succession	It would become possible to secure a motivated and capable successor among the employees
Provision of new farming opportunities	It would become possible to acquire management skills and agricultural techniques without an initial burden by getting jobs in farming corporations.
Tax benefits	Tax savings by using executive compensation as salary income Deductions for deficit carry-forwards for 10 years.
Increase loan limits	Loan limit for funds for strengthening agricultural management base (Super L funds) would increase (300mil yen for individuals, 1billion yen for corporations).

Source: Ministry of Agriculture, Forestry and Fisheries website

7. Tentative conclusions and future research topics

This study analyzed and considered the factors that have promoted/suppressed business start-ups in recent years, considering the effects of historical regional characteristics.

As for the industrial structure, as the hypothesis was that the effect of increasing the business start-up rate would be recognized in areas where the relative weight of the tertiary industries is relatively high. Tertiary industries, especially the service industries for business establishments, are industries for which the location is strongly oriented toward large cities. Thus, there is a possibility that the disparity in business start-up activities between cities and rural areas will increase. Maintaining economic vitality through the establishment of new businesses under the structural change in industry will become an increasingly important policy issue especially in rural regions. At the same time, since a large amount of money is required to opening a new manufacturing business, the business start-up rate in this sector is lower than that in tertiary industries; however, the ripple effect on other industries is relatively large. In particular, in rural areas where there are relatively few factors that contribute to business start-ups in the service sector, the activation of the manufacturing industry, which has a significant impact on the levitation of the local economy via outsourcing, will still be an important factor.

In addition, regarding the relationship between the employment environment and business start-ups, which has been a topic of debate in previous studies, a relationship was observed during the target period in the present study wherein unemployment contributed to new start-ups. Based on interview surveys in each region, the number of working age individuals per household has been declining because of the declining birthrate and aging population. Under such conditions, it seems that people are not willing to move to other areas when they do not have appropriate jobs locally, and that they tend to start their own business and earn income.

With regard to the qualitative aspect of the workforce, while there is a tendency for the business start-up rate to increase in regions where the ratio of foreigners is high, there was no effect in regions in which the proportions of highly educated personnel were relatively high had no such promoting effect. While the diversity of human resources activates local start-up activities, there is no tendency for the educational advancement of human resources to promote the establishment of start-ups. However, this study analyzed the start-up rate for all industries, ranging from low-tech to high tech, and knowledge intensive to labor intensive sectors. By observing the factors in each industry, it

may be possible that the influence of highly-educated human resources on start-up activities would be revealed. This should be investigated in future studies.

There were two conflicting directions regarding the impact of regional historical agricultural characteristics on business start-up behavior, which was the focus of attention in this study. The hypothesis based on the previous research was that the entrepreneurial behavior would be suppressed in regions historically centered on rice production due to the characteristics of production activities based on regional collaboration. However, reflecting the recent changes in agricultural policy, such as incentives for the entry of corporations and support for conversion from family business to corporate management, there has been a tendency to promote business start-ups in areas in which the ratio of rice crops is high. Whether this recent trend is a temporary one or a structural change is not clear at this point and should be clarified based on continuous observations in the future.

Finally, we would like to discuss future research topics. In the present study, we investigated the business start-up rates based on the Economic Census 2012-14. However, as noted in the paper, this was a period in which recovery from the Great East Japan Earthquake was a particularly important political issue, and in which public works had a large impact on the local economy. In that sense, there is a possibility that some special factors, which are not normally present, influenced business start-up activity. In the future, I would like to further generalize the discussion by comparing and analyzing multiple periods. In addition, as described above, the business start-up rates, and their defining factors, differ according to the type of industry. In particular, we would like to investigate the factors that promote and restrain the start-up of knowledge-intensive industries that are long-awaited, especially in rural areas. These topics remain as a matter to be investigated in the future research.

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