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"Efficiency of small and medium-sized real estate industry
-An analysis on the period after the burst of the bubble economy using micro-data"

Yasuo GOTO

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Efficiency of small and medium-sized real estate industry
-An analysis on the period after the burst of the bubble economy using micro-data

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Yasuo GOTO*
Seijo University

Summary: The real estate industry is a typical industry that suffered the most damage from the bursting of the bubble economy in Japan and seems to have not yet completely recovered from the severe situation overall. In this article we analyse the industry using comprehensive database which incorporate huge number of small and medium-sized enterprises. We confirmed that the real estate industry as a whole is not in a bad situation, but that the smallest tiers are performing poorly. It can be interpreted as not because of the large number of inefficient firms, but because of the high degree of inefficiency, in terms of inefficiency of firms which is evaluated with the criteria for "zombie" firm in this article. The average profit margin of SMEs in the real estate industry is relatively low, however, the proportion of zombie firms is not necessarily high. The problem is not the ratio of the number of zombies but the performance of zombies in the smallest class. In the real estate industry, relatively large-scale class generally has become out of the post-bubble situation. Improving the profitability of the smallest tier seems to be an unavoidable challenge for improving the performance of the industry as a whole.

JEL classification: P43, L25, M13, G32

* Faculty of Social Innovation, Seijo University, 6-1-20 Seijo, Setagaya-city, Tokyo, 157-8511, Japan.
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1. Introduction

Since the burst of the bubble economy around 1990, the Japanese economy has continued to grow at a low rate. During the 1990s, the direct damage caused by the bursting of the bubble was significant such as non-performing loan problem, however, even after the 2000s, when those effects seemed to have eased, the economic slump has not resolved. The background may be complex, but one of the major reasons is considered to be the decline in productivity and efficiency of the corporate sector. The decline in productivity itself has complicated factors, but in recent years, there has been a growing interest in the negative impact on productivity due to the stagnation of firm dynamics, which involve entry, growth and exit of firms. Many researchers such as Peek and Rosengren (2005), Caballero, Hoshi and Kashyap (2008), and Goto and Wilbur (2019) are concerned that over-debt, low-productivity firms remain stuck in the market, which may reduce the productivity of the entire firm sector. This low-productivity firms with excess debt are commonly referred to as zombie firms. In this paper, we will focus on the small and medium-sized real estate industry in particular, and statistically confirm the status of management efficiency from the perspective of each firm-size group and the perspective of zombie firms. Since the real estate industry is the most affected by the bubble economy in Japan, it may provide a powerful clue as to the stagnation of the Japanese economy after the burst of the bubble.

2. Statistical Analysis

(1) Data

We use comprehensive micro-data on SMEs of Credit Risk Database (CRD) data which incorporate huge number of samples managed by CRD Association, in the analysis of this paper[1]. CRD data is targeted at small and medium-sized enterprises and collects a huge amount of data every year. The frequency of the data is annual and the sample period is 13 years from 1995 to 2007. The average number of total samples is 635 thousand and 29 thousand, which is about 5% of the total, is of the real estate industry. The outline of the data is shown in Table 1. The average annual number of samples is over 600,000. Reflecting that

[1] CRD Association collects financial data on SMEs from (i) credit guarantee corporations, government-affiliated financial institutions, and private financial institutions such as regional banks. CRD returns to members information or reports using its credit risk measurement model, which is based on the collected data. The association was established in 2005 by the initiative of the Small and Medium Enterprise Agency of Japan. Details of the establishment are described in Maehara (2013).

CRD data is data specialized for SMEs, the values for workers, sales, and profit are all small. Medians are smaller than means because the distribution of firm size is right-skewed as widely known.

Table 1　Summary statistics of the sample

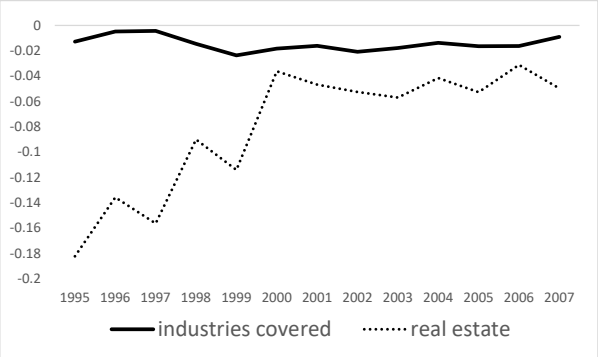
	number of employees	sales amount	current profit	establishment year	number of samples
unit	persons	thousand yen	thousand yen	A.D.	
mean	17.7	484,156	8,163	1979	635,306
median	6	122,000	600	1982	

Source: Calculation by the author

(2) Analysis by firm size

Below, the profit margin, calculated as current profit divided by sales, is used as an index for observing the management performance of a firm. While CRD data is reliable data, there are a small number of outliers, therefore, we used the sample excluding the upper and lower 0.01%. For each of all industries covered and the real estate industry, the average profit margin of each category was calculated and compared. Looking at the results of a sample of all sizes, it is characteristic that the profit margin of the real estate industry, which was most affected by the bursting of the bubble, was extremely low in the latter half of the 1990s (Figure 1). From the perspective of change, it followed a rapid improvement trend in line with the progress of non-performing loan disposal, but the trend stopped in the 2000s and has remained flat since then. Compared to all industries, the real estate industry's margin is consistently below the average for all industries, and it is the same after the 2000s.

Figure 1　Changes in profit margin: All sizes



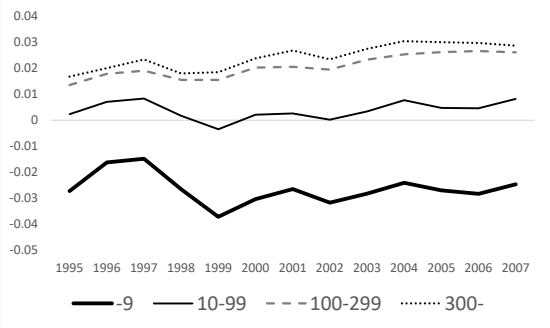
Source: Calculation by the author

Next, we divide the firm size into four categories. The size is evaluated by the

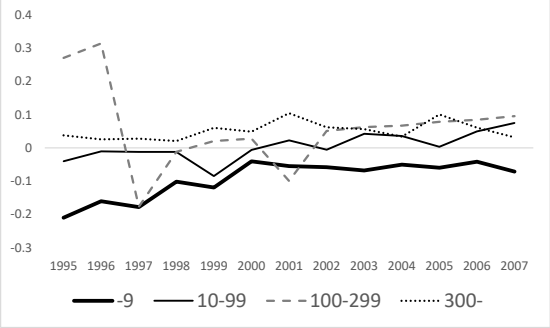
number of workers, and the four levels of scale are: 9 or less, 10 to 99, 100 to 299, and 300 or more. As for the profit margins of all industries by firm size, a clear tendency is observed that the smaller the size, the lower the profit margin, and the relative relationship is almost the same in the real estate industry (Figure 2 (i), (ii)).

Figure 2　Changes in profit margin by firm sizes

(i) industries covered



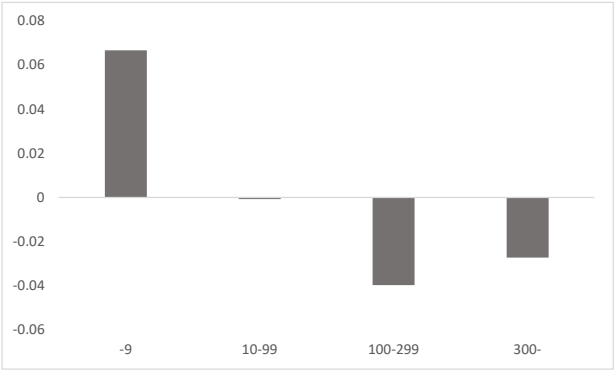
(ii) real estate industry



Source: Calculation by the author

At the beginning, it was confirmed that the profit margin of the real estate industry is constantly lower than the average of all industries. Next, from the viewpoint of each size level, we will examine which level of the real estate industry firm has a large disparity with all industries. Figure 3 shows the profit margins of all industries minus the profit margins of the real estate industry, and the larger the value, the inferior the real estate industry is. The average value for the entire period was used for comparison. The figure shows that the profit margins of smaller classes with less than 100 people, especially those with less than 10 people, are lower than those of all industries.

Figure 3　Comparison of profit margins of all industries and real estate industry by size

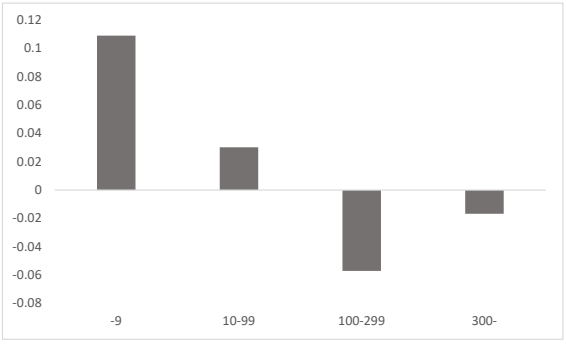


Source: Calculation by the author

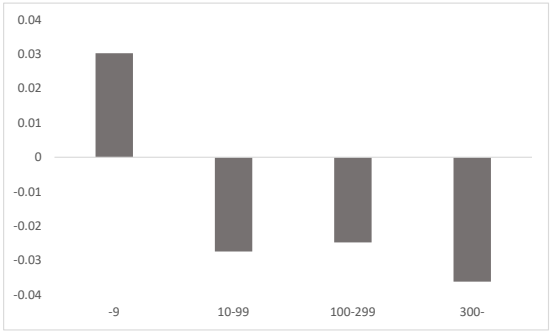
The same analysis was performed for sub-periods. The entire period was divided into two sub-periods: (i) before 2000, when the impact of the bursting of the bubble was large, and (ii) after 2001, when the impact was diminished by injecting public funds. The result is as shown in Figure 4, and before 2000 the average profit margins of the real estate industry were lower for less than 10 and 10-99 as well. The average of 100-299 was also barely higher than for all industries. However, since 2001, the average profit margins of each class of real estate industry with 10 or more employees have relatively improved, and all of them are higher than all industries. Only the smallest class with less than 10 workers is lower than all industries. In other words, it is the firm class with less than 10 that is lowering the average margin of the entire real estate industry throughout the period. And especially after 2001, it is clearly observed that the smaller the scale, the lower the profit margin than the average for all industries.

Figure 4　Comparisons of profit margins for two sub-periods

(i) before 2000



(ii) after 2001



Source: Calculation by the author

(3) Viewpoint of inefficient “zombie” firms

So, what kind of firms are lowering the profit margin of the real estate industry with less than 10 people? We will try to analyze from the perspective of a “zombie” firm here. “Zombies” are generally defined as insolvent firms that remain in the market instead of pursuing restructuring themselves or exit. Economists have paid attention on them as a key factor in Japan’s sluggish economic growth after 1990s, and criticized them, arguing that they distorted market and hurt other firms by depressing sales and profits and discouraging investment, and have hindered Japan’s economic recovery (Caballero, Hoshi, and Kashyap 2008; Hoshi and Kashyap 2011). In recent years, zombie firms have been focused on by other recessed economies experiencing long-term stagnation, such as the United States, the European Commission and China (Summers 2012, Stothard 2013, Zhongguo xinwen wang 2015).

In analysis using real statistical data, it is first important to identify zombie firms

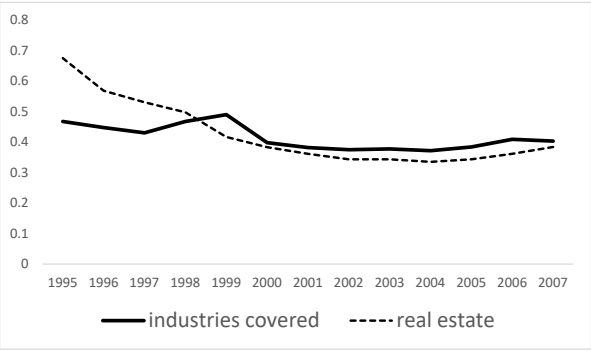
from the entire sample. There are several identification methods, but here we will introduce the representative ones by Caballero, Hoshi, and Kashyap (2008) and Fukuda and Nakamura (2011) among them. In short, CHK define zombies as firms whose interest payments are lower than the "hypothetical" risk-free payments (Caballero, Hoshi, and Kashyap 2008, 1948). On the other hand, FN have two additional criteria: profitability and evergreen lending. FN emphasize the importance of profitability, since credit risks of firms with earnings before interest and taxes (EBIT) that exceed the firms' hypothetical risk-free interest payments are low in general, and it naturally leads to lower interest payments. They argue that evergreening lending also should be considered of, because financially troubled firms might have their debts rolled-over by the banks in facing difficulties with repayment. Reflecting these perceptions, FN define zombies as firms which meet the criteria of profitability and fulfil at least one of the criteria of interest payments (the CHK definition) and evergreening. Since credit risk is an essential point in lending to SMEs, we use FN method in this paper. A brief expression of their method is as follows.

$$I_{i,t}^{*} = r_t^{short} * B_{i,t-1}^{short} + \left(\frac{1}{5}\sum_{j=0}^{4} r_t^{long}\right) * B_{i,t-j}^{long} + \min(r_{t-4}^{cb}, \ldots., r_t^{cb}) * Bonds_{i,t-1}$$

where $I_{i,t}^{*}$: minimum required interest, $r_t^{short/long/cb}$: interest rate,
$B_{i,t}^{short/long}$: borrowings from banks,
$Bonds_{i,t-1}$: issued amount of corporate bonds

Minimum required interest is the amount of interest payment that is virtually calculated using the prime rate. If $I_{i,t} < I_{i,t}^{*}$, where $I_{i,t}$: actual interest paid, the firm is regarded as zombie given interest payment support. This is nothing but CHK criterion. On the contrary, in case with FN criterion, if $I_{i,t}^{*} > EBIT$ and $(B_{i,t} > B_{i,t-1}$ or $I_{i,t} < I_{i,t}^{*})$, the firm is regarded as zombie, where $EBIT$ represents profit before interest and taxes. Figure 5 is drawn using the result.

Figure 5 Zombie firm ratio among all industries and real estate industry



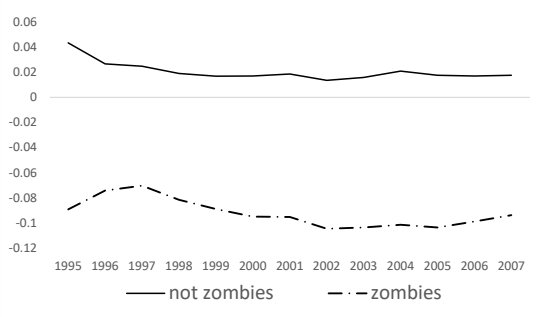
Source: Calculation by the author

It shows zombie ratio which is the ratio of the number of zombie firms to all firms. The ratio of the real estate industry is not particularly high compared to the whole. It was relatively high until 1998, but it has been lower since then. This suggests that the low profit margin of the real estate industry, which we confirmed earlier, is not due to the large number of zombie firms, but that the average performance of firms in the industry, including zombies, is generally poor.

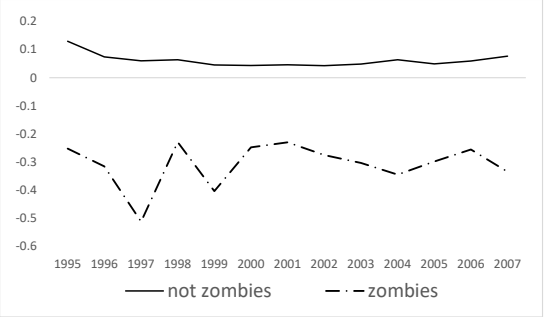
Comparing the performance of these zombie firms with those of non-zombie companies, the profit margins of zombies are clearly lower in both all industries and in the real estate industry. Though it may seem obvious, as we use profit as an information to identify zombie firms, it should be noted that we did not use profit itself, but the relative magnitude to interest payments and evergreening indicator which does not have direct relation to profit.

Figure 6　Average profit margins for zombie firms and non-zombies

(i) industries covered



(ii) real estate

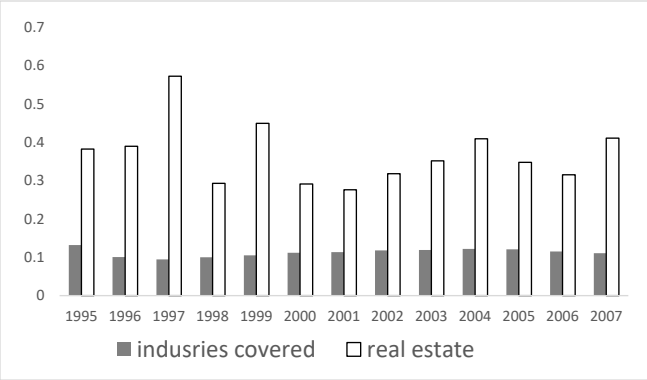


Source: Calculation by the author

The relative relationship that non-zombies' average profit margin is constantly higher is common, but the disparity between zombies' and non-zombies' is quite different. The gap is much larger in the real estate industry, and we can see it in Figure 7. The height of the bar graph means the profit margin of non-zombie firms minus that of zombie firms. On average, the gap in the real estate industry is more than double the gap in all industries.

The average profit margin of SMEs in the real estate industry is relatively low, however, the proportion of inefficient zombie firms is not necessarily high. The problem is not the ratio of the number of zombies but the performance of zombies in the smallest class. Even in the real estate industry that was most damaged by the bursting of the bubble, relatively large-scale class generally has become out of the post-bubble situation. Improving the profitability of the smallest tier seems to be an unavoidable challenge for improving the performance of the industry as a whole.

Figure 7　Disparity of average profit margins between zombies and non-zombies



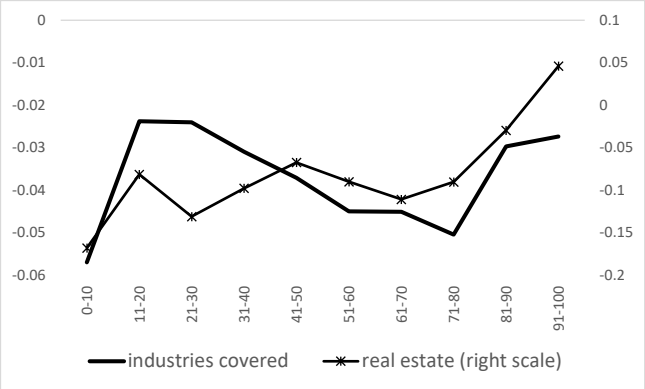
Source: Calculation by the author

(4) firm age

The perspective of zombie firm is strongly related to the firm dynamics consisting of entry, growth and exit. If inefficient zombie firms does not exit and remains unnaturally in the market, new entrants may be hindered and the growth potential of the industry as a whole might decline. As a clue to consider such firm dynamics, we calculated the average profit margin for each firm age. CRD data incorporates firm age information in respective 5-year categories.

Shown in Figure 8, In all industries, the profit margin is low immediately after entry, but then rises rapidly, reaching the highest in the period of 20 to 30 years. After that, the profit margin tends to decrease as the firm age increases. On the other hand, the real estate industry has shown a significantly different trend in that profit margins have almost consistently increased with increasing firm age. This fact suggests policy implications. While it is generally believed that promoting firm dynamics contributes to improving the growth potential of the industry as a whole, as for real estate industry just promoting firm dynamics may not be enough. Exploring what is an effective measure is a future research topic, and unlike the manufacturing industry, one major point might be that it has a strong character as a stock business.

Figure 8　Average profit margins by firm age



Note: The value is the average of pooled data for the entire period. As long as the firm survives, the age of the firm will increase over time. In other words, the same firm will move up one category in five years.
Source: Calculation by the author

3. Conclusion

The Japanese economy has been severely damaged by the bursting of the bubble, and its huge negative effects have not yet completely disappeared. The aftereffects of the bubble can be seen and hidden behind the ongoing low economic growth. Such financial-based shocks across the macro economy are no longer unique to Japan. Today, Japan's experience could be a lesson for more or less many countries in the world.

The real estate industry is a typical industry that suffered the most damage from the bursting of the bubble economy in Japan, and seems to have not yet completely recovered from the severe situation overall. In this article we see that the real estate industry as a whole is not in a bad situation, but that the smallest tiers are performing poorly. It is not because of the large number of inefficient firms, but because of the high degree of inefficiency. So what are the factors behind the low performance of the smallest tier? That is a future research agenda, and eliminating the factors leading to stagnation of entry and exit of firms in the industry and excess debt, etc. will be the candidates from point of view of metabolism of the entire industry in recent years. But at the same time, it seems that its strong character as a stock business should be considered as well.

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