Rising Markups among Japanese Listed Firms

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1. Introduction

Since the 2010s, a growing number of empirical studies have been documented the rise of markups in the United States and Europe. A representative previous studies on the rise in markups are De Loecker and Eeckhout(2018), De Loecker, Eeckhout, and Unger(2020) and IMF (2019). De Loecker, Eeckhout, and Unger (2020) find that aggregate markups of US firms increased from 21% in 1980 to 61% in 2016. IMF (2019) also presents that the annual rate of increase in markups exceeded 6% from 2000 to 2015 among 27 developed countries. The explanations for the rise in markups significantly focuses on the emergence of superstar firms (Autor et al. (2020), and role of intangible capital (Crouzet and Eberly (2019).

On the other hand, Nakamura and Ohashi (2019) and Aoki, Hogen, and Takatomi (2023) find that markups have not increased, unlike the United States and other developed countries. Nakamura and Ohashi (2019) and Aoki, Hogen, and Takatomi (2023) adopt the methodology used in De Loecker, Eeckhout, and Unger (2020) to estimate the firm level markups. In contrast to these studies, Takizawa, Hosono, and Miyakawa (2020) obtain that markups are rising at an annual rate of 0.4% from 2010 to 2018 using production approach. Fukao and Nishioka (2021) and Fukao et al. (2021) also find that markups increased over the Abenomics period (2011-2015) using cost approach. Based on the above studies, it is evident that a consensus on markups trend has not yet formed in Japan.

This study aims to ascertain whether there is the rise in markups using Japanese listed firm database.

The remaining paper is structured as follows. Section 2 reviews measurement method and evolution of markups. Section 3 describes markups in Japanese listed firms. Section 4 presents the determinants of markups. Section 5 concludes.

2. Measuring Markups and Evolution of Markups

There are the two approaches to estimate markups- the ratio of product price to marginal cost-: production approach and cost approach. Production approach by De Loecker and Eeckhout(2018) and De Loecker, Eeckhout, and Unger(2020) compute markups from the output elasticities of an input divided by that input's revenue shares. The markups of production approach can be written as:

$$\mu_{ft} = \alpha_{ft} \frac{P_{ft}Q_{ft}}{P_{ft}^{V}V_{ft}} \tag{1}$$

where μ_{ft} is the markup, α_{ft} is the elasticity of output with respect to the variable input, P_{ft}^{V} is the price of the variable input, V_{ft} is the quantity of the variable input, and $P_{ft}Q_{ft}$ is total revenue. To derive a firm's markups, first of all, it is necessary to measure the output elasticity through the production function estimation (separately for industry and year). Next, the revenue share of the variable input is calculated using the information on sales and expenditure on variable inputs (Cost of Goods Sold). De Loecker and Eeckhout (2018) document the evolution of markup over 70,000 firms in 134 countries from 1980 to 2016 using production approach. Figure 1 provides the evolution of global markups. As shown Figure 1, global markup has risen up from 1.18 in 1980 to 1.67 in 2014.

Figure1. Global Markups

Source) De Loecker and Eeckhout (2018)

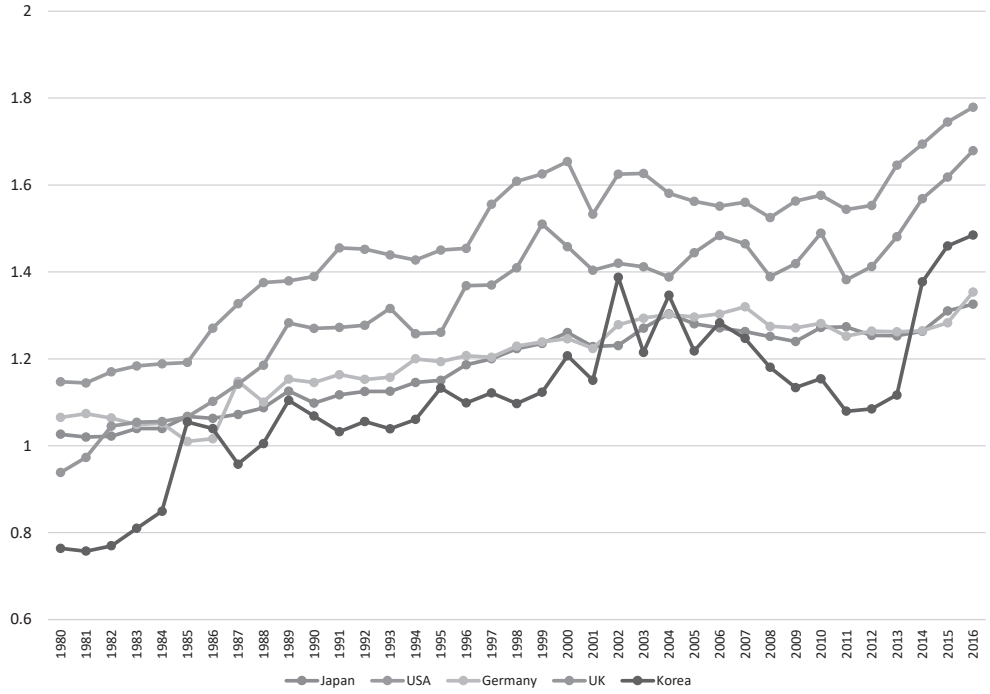
Figure 2 provides the evolution of markups by country. It can be seen that markups are increasing in all advanced economies. Furthermore, it can be observed that the markups increase in Japan and Germany are comparatively smaller than in other countries. In particular, it is shown that markups in the United States is trending at its highest.

Here, it can be confirmed that markups are rising in Japan, just like in countries such as the United States.

The second approach is cost approach, which computing markups from the revenues divided by the total costs. This approach measures total cost and approximates output elasticity from cost shares of inputs without estimating production functions. I measures the sectoral markups as Fukao and Nishioka (2021):

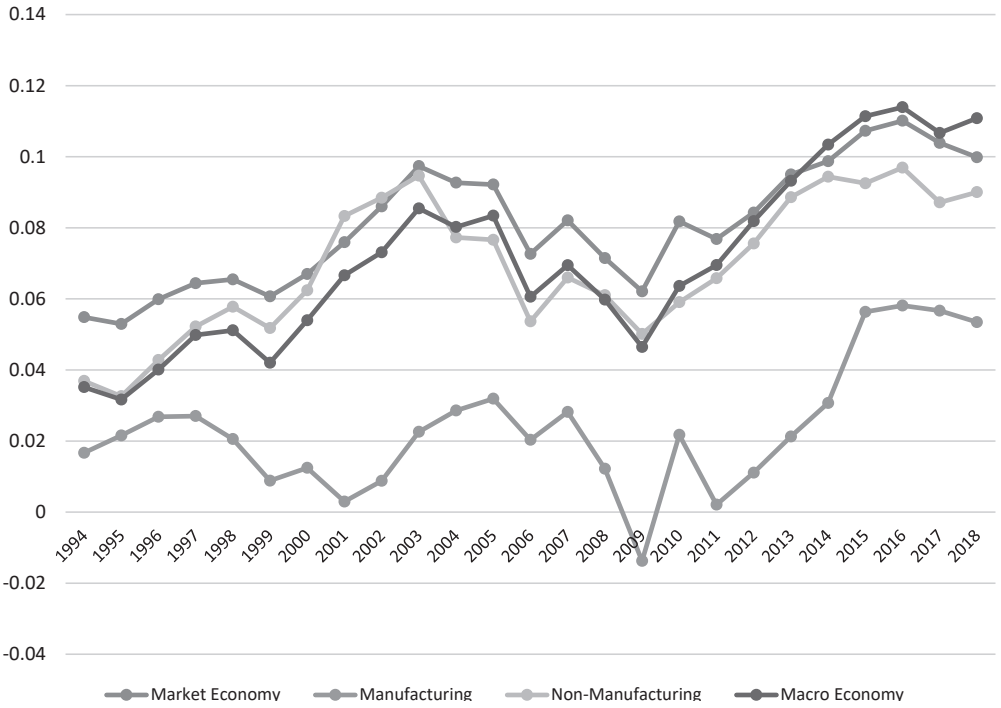
$$\mu_{st} = \left[\frac{(Gross\ Operating\ Surplus_{st}+Labor\ Cost_{st}+Intermediate\ Input\ Cost_{st})}{(Capital\ Cost_{st}+Labor\ Cost_{st}+Intermediate\ Input\ Cost_{st})-1}\right] \quad (2)$$

Figure 2. Evolution of Markups by country



Source) De Loecker and Eeckhout (2018)

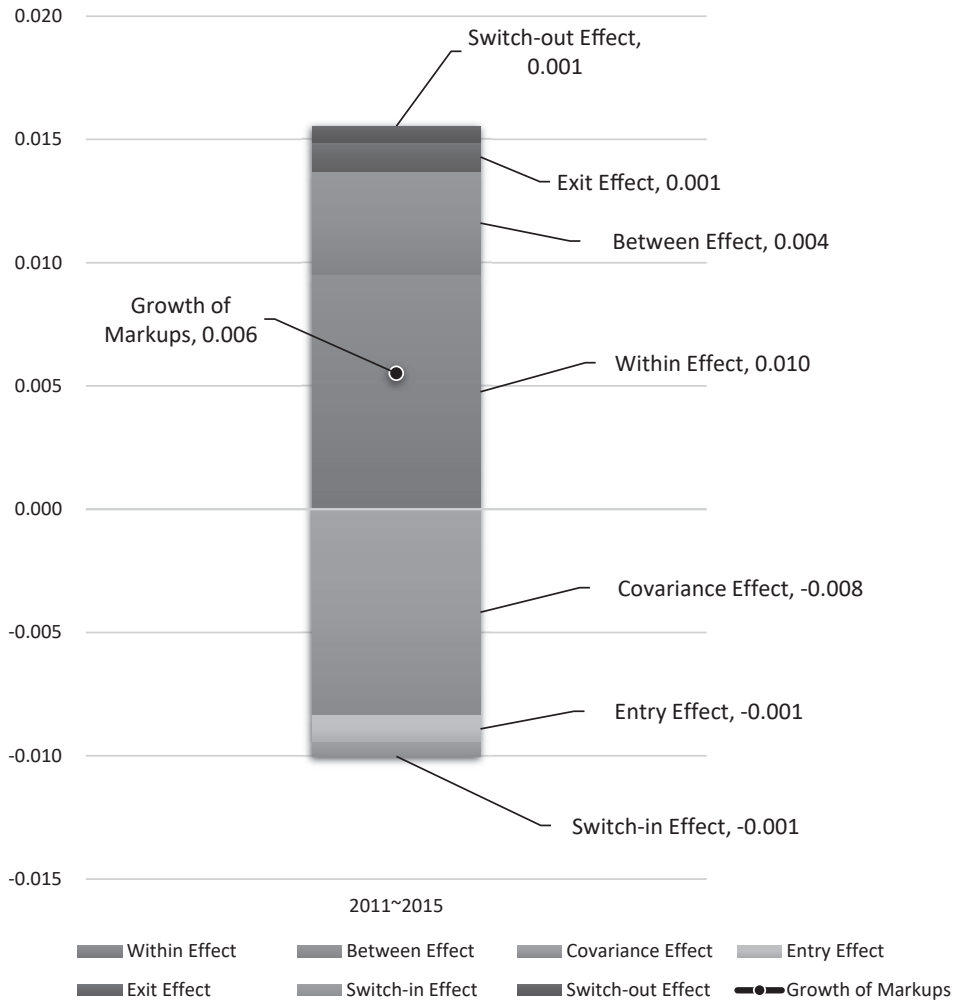
Figure 3. Evolution of Markups in Japan by industry



I plot the evolution of the markups based on cost approach by industry in Figure 3. Markups have increased as well as the production approach, except that markup declined during the Asian and global financial crises. It can be seen that markups for macro economy have increased from 3% of sales relative to total cost in 1994 to 11% in 2018. The figure 3 shows that non-manufacturing sector have higher markups compared to the manufacturing sector.

Figure 4 is reported the result of decomposition of the change in markups based on cost approach using micro data of *Economic Census for Business Activity* [1)]. Markups are rising at an annual rate of 0.6% over the period of Abenomics. The decomposition shows the change in markups is mainly driven by the change within firms. There is some change in the composition between firms, but that is relatively minor compared to the within firms. The change due to reallocation, the covariance effect, is a significant negative.

Figure 4. Decomposition of Change in Markups



Source) Fukao et al. (2021)

1） The decomposition method adopted the methodology used by Foster, Haltiwanger, and Krizan (2001).

As I already observed in Figure 2, Figure 3, and Figure 4, it can be said that markups in Japan are on the rise similar to the United States experience.

3. Markups in Japanese Listed Firms

For compute markup, I used the DBJ's Corporate Financial Databank, which contains unconsolidated financial statements for listed firms. Each firm's financial statements includes the Income Statement and the Balance sheet. This allows to obtain firm's sales, variable costs (cost of goods sold), total wages, capital expenditure, and nominal intermediate inputs. Nominal intermediate inputs are calculated by subtracting the total wages and depreciation from the total cost of goods sold, selling, general, and administrative expenses. I construct firms' markups based on cost approach such as equation (2) using firm-level panel data spanning the period 1970 to 2018. Labor cost is defined as total wages and intermediate costs is defined as nominal intermediate inputs. Capital cost is calculated by multiplying the real net capital stock with the user cost of capital [2)].

Figure 5. Evolution of Average Markups (1970-2018)

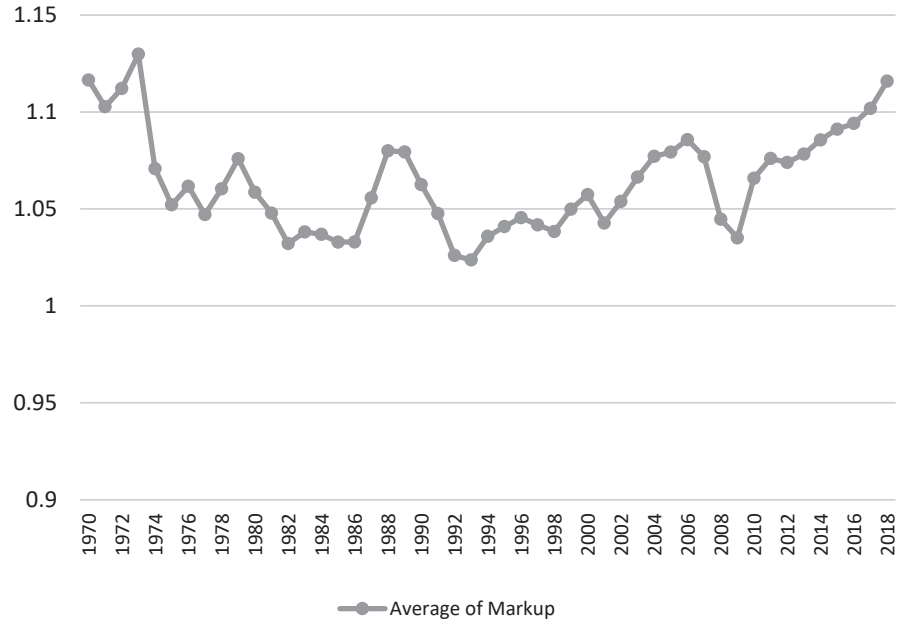


Figure 5 presents the evolution of unweighted average markups in listed firms over the period 1970 to 2018. The average markups of listed firms in Japan are very high over the period, exceeding 100% of sales relative to total cost. The average markups experienced an increase, except oil shock, bubble burst and the global financial crisis occurred. Average markups have steadily risen up since 1993. In 2018, the level of markup is similar to that of 1970.

Figure 6 reports evolution of average markups by industry. Similar to the result of Figure 3, the average markups of manufacturing firms are lower than that of non-manufacturing firms.

2） The data of the user cost of capital is taken from JIP database 2021.

Figure 6. Evolution of Averge Markups by Industry

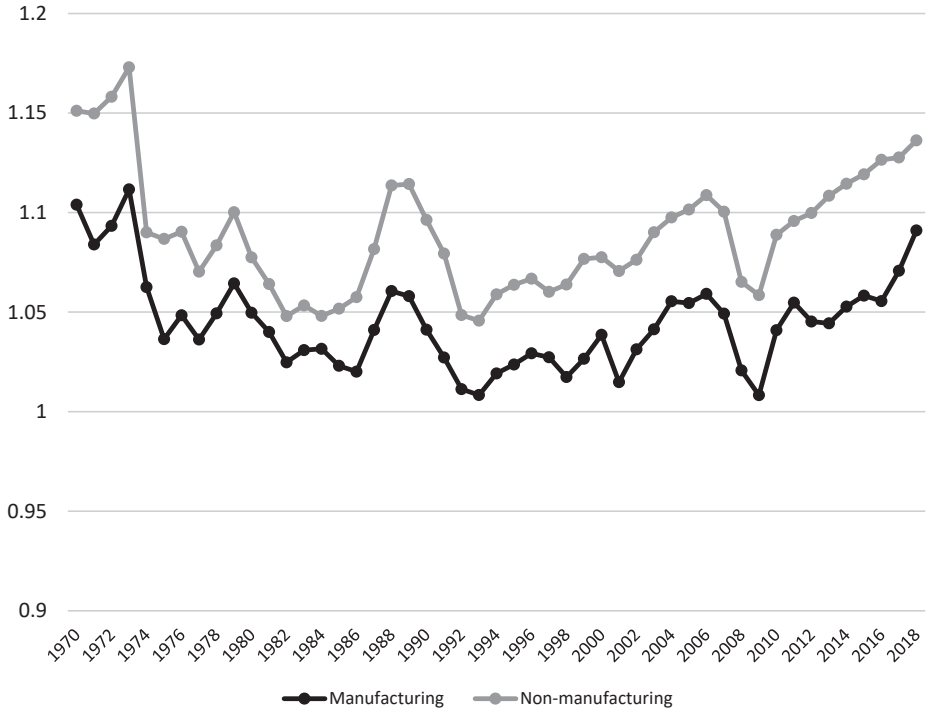


Figure 7. Distribution of Markups

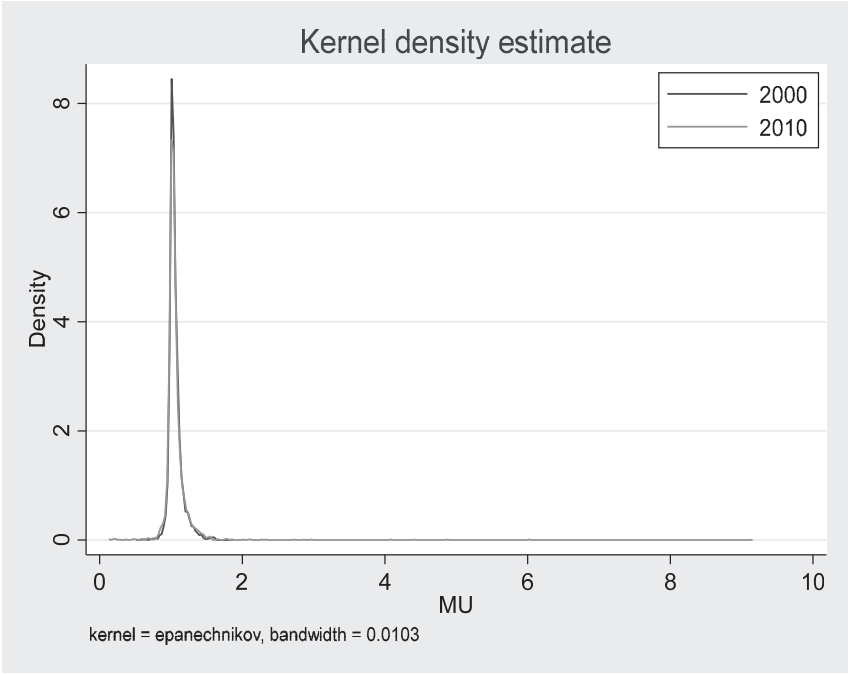


Figure 7 plots the unweighted markups distribution. It is evident that the variance of markups has been rise. This figure suggests that the dispersion between firms has been widening in recent years.

Given these evidence, I conclude that the average markups of Japanese listed firms have risen.

4. Determinants of Markups

This section presents empirical evidence on determinants of markups in Japanese listed firms.

I estimate the determinants of the markups at the firm level using the following equation:

$$MU_{f,t} = \alpha + \beta X_{f,t} + firm\ dummies + Year\ Dummies + \epsilon_{f,,t}$$

where $MU_{f,t}$ represents markups, f indexes firm, and t represents year; $X_{f,t}$ is a set of firm-level variables, including TFP level, firm size, R&D dummy, advertisement intensity , and $\epsilon_{f,,t}$ is the residual.

I use four firm level variables. First, I use each firm's TFP (Total Factor Productivity) level relative to the average of the industry in which the firm operates, using the index number method employed by Good et al. (1997). Second, firm size is measured according to the log number of employees. Third, R&D dummy variable where it takes a value of one if firm conduct R&D investment. Lastly, the advertisement intensity is the ratio of advertisement to total sales. Firm fixed effects and year dummy are included in all the estimations of the equation.

Table1. Determinants of Markups

Dependent variable: Markups	Full sample (1)		Manufacturing (2)		Non-manufacturing (3)	
LOGTFP	0.2283	8.12 ***	0.1520	4.54 ***	0.4112	8.98 ***
LOG(sales)	-0.0016	-0.32	-0.0034	-0.36	-0.0002	-0.04
R&D dummy	0.0038	1.77 *	0.0008	0.4	0.0132	2.33 **
ADS	0.0215	0.32	0.2239	1.47	-0.0243	-0.32
Constant	1.1116	11.8 ***	1.1175	6.69 ***	1.1177	10.82 ***
year dummies	Yes		Yes		Yes	
firm effects	Yes		Yes		Yes	
Number of observations	64,037		33,950		30,087	

Note: The t-statistics based on robust standard errors are reported right the coefficient estimates. ***p<0.01. **p<0.05. *p<0.1

Table 1 provides the estimation results on determinants of the firm's markups based on the fixed effect model. I find that the TFP has significant positive influences on markups. This finding suggests that more efficient firms are able to set higher markups. This result is so robust that it remained consistent even when estimated separately for manufacturing and non-manufacturing sectors. Firm size has a statistically insignificant negative relationship on markups. This is a surprising result, considering that, generally, firm with higher size has higher productivity and markups. I also find that R&D has a positive influence on markups. This result may be capturing the fact that the higher firm's innovative capacity, the higher the markups. The effect was particularly pronounced in the non-manufacturing sector. Finally, I find that the effect of advertising, which serves to increase demand, on markups is not statistically significant. This fact suggests that the rise of markups is not a demand-driven factor.

Table2. Determinants of Markups by Periods

Dependent variable: Markups	1970-1979 (1)	1980-1989 (2)	1990-1999 (3)	2000-2009 (4)	2010-2018 (5)
LOGTFP	0.3074 9.46 ***	0.1688 9.88 ***	0.4892 14.79 ***	0.8302 9.42 ***	0.8555 11.45 ***
LOG(sales)	0.0426 8.16 ***	0.0378 8.8 ***	0.0240 3.95 ***	-0.0169 -1.82 *	-0.0157 -2.17 **
R&D dummy	0.0027 0.99	-0.0019 -0.82	0.0018 0.74	0.0002 0.04	0.0015 0.37
ADS	0.7749 4.04 ***	0.0413 0.39	-0.0007 -0.01	-0.0435 -0.72	-0.1904 -3.18 ***
Constant	0.3705 4.01 ***	0.4044 5.24 ***	0.6722 6.19 ***	1.4132 8.44 ***	1.4145 11.35 ***
year dummies	Yes	Yes	Yes	Yes	Yes
firm effects	Yes	Yes	Yes	Yes	Yes
Number of observations	11,915	12,577	13,897	16,563	8,294

Note: The t-statistics based on robust standard errors are reported right the coefficient estimates. ***p<0.01. **p<0.05. *p<0.1

Table 2 presents that the results estimated separately by periods. It can be confirmed that the positive relationship between markups and TFP remains unchanged even when estimated by periods. Evidently, the effect of firm size on markups has been shifting towards a negative relationship since 2000. In contrast to the estimated result for the full sample, R&D activity is unrelated to markups. Furthermore, the advertisement intensity has a significantly positive relationship on markups in the 1970s, but it has turned into a negative relationship since 2010.

Overall, I confirm that TFP is the most significant driver of the rise of markups.

5. Concluding remarks

In this paper, I examined the evolution of markups in Japanese listed firms. Using firm-level panel data from the DBJ Database from 1970 to 2018, I find that the markups of Japanese listed firms have risen up since 1993. Second, I find that the rise of markups relied on the most to the TFP.

There are remains some issues for the future research. First, I think that it is necessary to examine whether the markups have increased in a database that includes small firms, as Aoki, Hogen, and Takatomi (2023). Second, I think that it is necessary to conduct a detailed analysis to determine why markups increased in Japan's major firms during the period of deflation. Finally, it is also necessary to examine which industries lead the markups to rise.

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